GYNECOLOGY.

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THE STUDENTS' HANDBOOK OF GYNECOLOGY

SPECIALLY DESIGNED TO ASSIST THOSE COMMENCING THE STUDY OF DISEASES OF WOMEN.

ILLUSTRATED WITH 49 ENGRAVINGS.

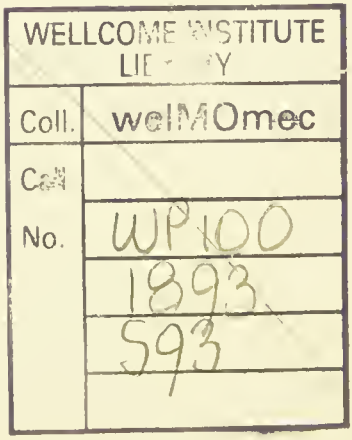
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PREFACE.

THIS book is written for Students, and especially for those beginning the study of Diseases of Women.

It makes no pretension to compete with the exhaustive and most valuable gynecological text-books which are so well known in this country.

The author has aimed at brevity and conciseness, and trusts that he has supplied a want which is felt by many Students grappling with the difficulties of the subject.

He desires to express his indebtedness to the works of POZZI, HART and BARBOUR, WINCKEL, SCHROEDER, and other authors.

EDINBURGH,
July 1893.

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GYNECOLOGY.

ANATOMY OF THE FEMALE PELVIS.

THE EXTERNAL GENITALS.

Labia Majora, Labia Minora, Clitoris with its prepuce, Fourchette, Vestibule, Fossa Navicularis, Hymen. (Fig. 1.)

The Labia Majora are the two thick hair-covered eminences on each side of the vulvar orifice; they consist of skin enclosing fat, dartos, etc. In front of the symphysis they blend in the mons veneris—*anterior commissure;* behind, they thin out, and are joined merely by a fold of skin—the *fourchette* or *posterior commissure.*

The Labia Minora are two small folds of skin on the inner surface of the upper portion of the labia majora. At their posterior ends they blend with the labia majora about opposite the middle of the latter. In front, each divides into an upper and lower portion. The two upper meet to form the prepuce of the clitoris; the two latter form its suspensory ligament. They contain both sebaceous and sweat glands.

The Clitoris lies in the middle line above the labia minora. It consists of the body and of the glans clitoridis; the former consists of the united crura clitoridis which arise from the ischio-pubic rami; the glans is connected with the body by means of the intermediate part of the bulbs of the vagina.

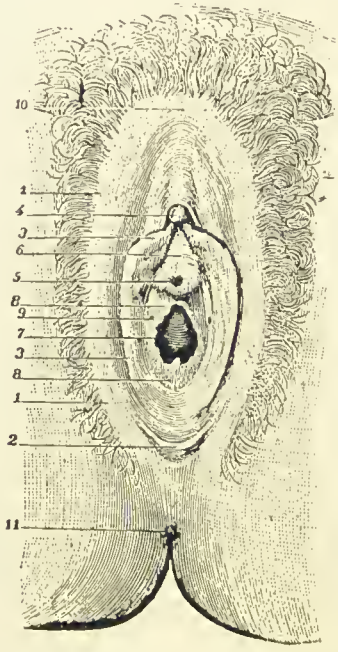


Fig. 1.—External Genitals.

1 Labium majus. 2. Fourchette. 3. Labium minus. 4. Clitoris. 5. Urethral orifice. 6. Vestibule. 7. Vaginal orifice. 8. Hymen. 9. Orifice of Bartholinian glands. 10. Anterior commissure. 11. Anal orifice.

The Vestibule is the smooth surface below the clitoris; it is bounded on each side by the labia minora, and below by the lower end of the anterior vaginal wall.

The **Vaginal Orifice** lies between the base of the vestibule and the fossa navicularis. It is marked by the hymen in the virgin. The *hymen* may be crescentic or diaphragmatic; in the latter case, the opening in it may be round, oval, cribriform or slit-like. After coitus the hymen is either stretched or torn, usually the latter; after labour it exists only in the form of tags attached around the vaginal orifice and known as the *caruncul*æ *myrtiformes.*

On each side of the vaginal orifice lies a small mass of erectile tissue. These are known as the *vaginal bulbs.* In *front* they *are* joined by an intermediate portion, which is continuous with the clitoris.

Posterior to the bulbs lie the *Bartholinian glands,* one on each side. Each has a duct which opens close to the hymen.

The **Fossa Navicularis** is an artificial depression made by pulling back the fourchette. Normally, the fourchette and outer surface of the hymen are in contact.

The following points are to be specially noted :—

In the erect posture only the mons veneris is seen; the labia majora and minora are nearly parallel with the horizon and are in contact. To see all the outer genitals, the labia must be artificially separated. The vulvar slit runs antero-posteriorly, the vaginal orifice transversely.

THE UTERUS.

The nulliparous uterus may be roughly described as having the shape of a flattened pear. Viewed from

the front or back, it is somewhat triangular in shape, the apex being rounded forming the vaginal portion of the cervix, the base being a curved line—the fundus, and the sides being bent inwards at a point two-thirds of the way from the base to the apex. Viewed from the side, the anterior wall appears much flatter than the posterior wall; a depression is seen especially in the posterior wall at the same level at which it was

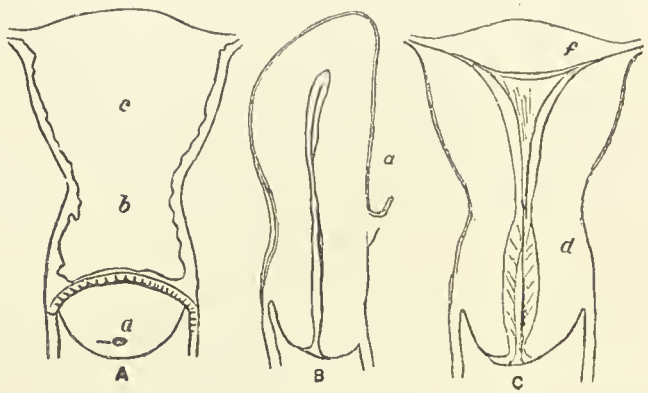


Fig. 2.—*(Sappey.)*

A Virgin Uterus, seen from front. *a* Cervix (vaginal portion). *b* Isthmus. *c* Body. *a b* Entire Cervix.

B The same in Vertical Mesial Section. *a* Anterior surface, and lies just above where Peritoneum passes on to Bladder.

C The same with cavity exposed by Coronal Section. *e* Os externum. *d* Os internum. *f* Uterine opening of Fallopian tube.

seen when the uterus was looked at from the front or back; this depression marks the division of the uterus into body and cervix; it is placed opposite the os internum and is called the isthmus. The cavity of the uterus extends from the os externum to the fundus, where, on each side, it communicates with a Fallopian tube. When the uterus is cut coronally, that part of

the cavity in the body appears triangular in shape, the cervical portion being spindle-shaped; when it is cut in vertical mesial section the cavity appears as a mere slit. The narrowest parts of the cavity are the os externum and os internum.

The cervix is considered by many as being made up of three portions—viz., a supra-vaginal portion between the level of the os internum and the posterior fornix,

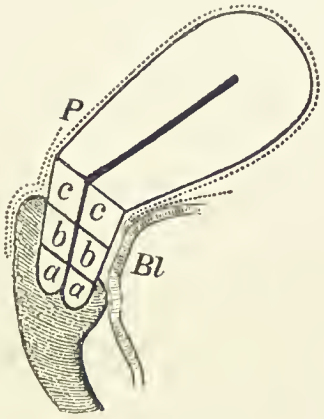


Fig. 3.—*(Schroeder.)*
Diagram of Uterus to show divisions of Cervix.

a Vaginal portion. *b* Intermediate portion. *c* Supravaginal portion. *bl* Bladder. *p* Peritoneum. The dotted line shows peritoneum.

an intermediate portion between the levels of the anterior and posterior fornices and a vaginal portion below the level of the anterior fornix. This division is a purely artificial one, and is of service in helping us to understand the nature of the different varieties of hypertrophy of the cervix (see page 105).

Measurements.—Length of uterus, 3 inches; width at the fundus, the widest part, 2 inches; width of cervix,

1 inch; thickness of uterus, 1 inch; thickness of walls, about $\frac{1}{2}$ inch; length of cavity of whole uterus, $2\frac{1}{2}$ inches, of body, $1\frac{1}{2}$ inches; and of cervix, 1 inch.

Structure.—It consists of the peritoneal covering, the muscular wall, and the mucous membrane lining it.



Fig. 4.—*(Turner.)* SECTION THROUGH UTERINE MUCOSA.

e Columnar epithelium (cilia not shown).
g g Utricular glands. *c t* Inter-glandular connective tissue.
v v Blood-vessels. *m m* Muscle.

1. **Peritoneum.**—This covers the fundus, most of the anterior and posterior walls, but not the lateral walls; the sides are uncovered owing to the reflection of the peritoneum from the anterior and posterior walls to form the broad ligaments. Less of the anterior is covered than the posterior; on the former the peritoneum is reflected on to the bladder at the level of

the junction of body and cervix; on the posterior wall it passes as far down as the junction of the intermediate and super-vaginal portions of the cervix and then is reflected on to the posterior vaginal wall.

Ligaments of Uterus.

(*a*) *Broad,* see p. 21.

(*b*) *Round.*—There is a right and a left round ligament. Each arises from the upper angle of the uterus just below the Fallopian tube and passes in the broad ligament upwards and outwards to the internal abdominal ring.

(*c*) *Utero-Sacral.*—There is a right and a left one. Each is a fold of peritoneum containing fibrous tissue and non-striped muscle, passing from about the junction of the body and cervix on each side upwards and outwards towards the second sacral vertebra.

(d) Utero-Vesical.—These are the folds occurring at the reflection of the peritoneum from uterus to bladder; they are unimportant.

2. The **Muscular Wall.**—There is a thin layer under the peritoneum, which passes into the ligaments of the uterus, a middle layer, and an inner one especially arranged in concentric layers surrounding the inner ends of the Fallopian tubes, the os externum and the os internum.

3. The **Mucous Membrane.**—

(1) Of the Body.—It is a thin red-gray layer which rests on the muscular wall, and consists of glands, interglandular tissue and a lining layer of columnar ciliated epithelium. The glands run down from the

surface, for the most part obliquely, towards the muscular tissue; they usually divide into two or three branches at their lower ends and are lined with columnar ciliated epithelium. The inter-glandular tissue consists of round and oval cells, and delicate connective-tissue fibrils; between the lower ends of the glands prolongations of the muscular fibres extend upwards for a short distance. Numerous vessels are in the mucosa.

(2) Of the Cervix. — The mucosa, reddish in colour, is here thrown into folds—forming the *arbor vitæ*, consisting of a vertical mesial ridge with lateral branchings on both anterior and posterior walls. It consists of a lining epithelium, glands, and inter-glandular tissue. The lining epithelium is columnar and on the projecting parts of the ridges only is ciliated. The glands are of the racemose variety; they branch considerably and are slightly dilated at their inner ends. They open both on the elevations and depressions of the mucosa, and are lined with columnar non-ciliated epithelium. The cervical mucosa gradually passes into that of the body at the level of the os internum. The mucosa stops at the os externum.

The vaginal part of the cervix is covered with stratified squamous epithelium and is of a pale pink-grey colour. It contains no glands.

The following points are to be noted:—

In a child the arbor vitæ extends from os externum to fundus, in the nulliparous adult from os externum to os internum, and in the multipara they do not reach quite to the os internum.

In the nulliparous adult the os externum is a small round hole which feels like a mere dimple; in a multipara it is more or less fissured, and is a lateral slit.

The cervix has more fibrous tissue in proportion to the musele than the body has, and the latter is arranged somewhat in the form of a network.

There is no sueh thing as a lower uterine segment in the non-pregnant uterus; it is only formed during pregnaney.

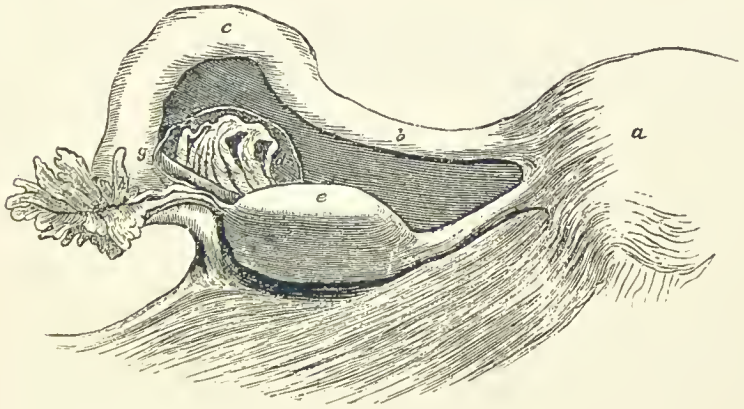


Fig. 5.—*(Henle.)*

Posterior view of the lateral angle of the Uterus, a part of the Left Broad Ligament, Fallopian Tube, Ovary, and Parovarium.

a Uterus. *b* Isthmus of Fallopian tube. *c* Ampulla. *g* Near outer end of tube. *d* Parovarium. *e* Ovary. *f* Ovarian Ligament. *l* Infundibulo pelvic ligament. The normal topographical relations are disturbed here.

FALLOPIAN TUBES.

These are two trumpet-shaped tubes which run, one on each side, from the upper angle of the uterus outwards towards the side of the pelvis; they are more

expanded at their outer than at their inner ends. Each is divided into three parts—viz., isthmus, ampulla, and fimbriated end or pavillion. They vary in length from three to five inches.

The **Isthmus**, starting from the uterine cavity, runs through the uterine wall, and outwards for about an inch. It is the smallest portion of the tube admitting only a bristle.

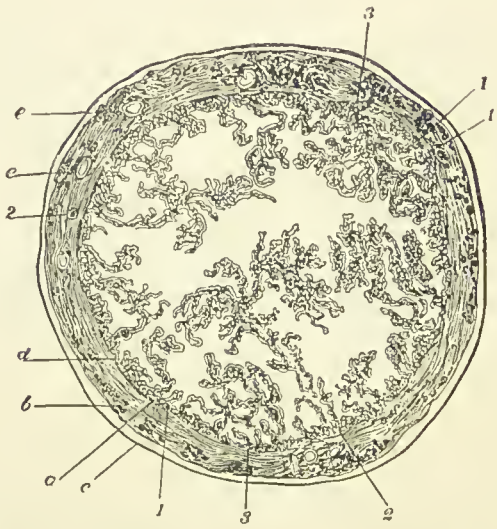


Fig. 6.—*(Luschka.)* SECTION THROUGH AMPULLA.
(Under low power.)

a Submucous Layer. *b* Muscular Layer. *c* Serous Coat. *d* Mucous Membrane. *e* Vessels. *1* Small primary folds. *2* Larger and longitudinal and accessory folds. *3* Small folds united, forming canaliculi.

The **Ampulla**, continuous with the isthmus, runs outwards and upwards over the ovary. It is about 2 inches in length and is of larger size than the isthmus, as its lumen will admit a uterine sound.

The **Fimbriated End** turns downwards and backwards in the direction of the ovary. The end is funnel-shaped and surrounded with fimbriæ, one of which is called the ovarian fimbria, because it passes to the ovary.

Structure.—

1. Outer coat is the peritoneal one.

2. Middle coat consists of connective tissue and muscle, the latter being arranged in an external longitudinal and an internal circular layer. At the uterine end the latter layer forms a well-marked sphincter.

3. Inner layer or mucous membrane. This is markedly folded longitudinally. It consists of delicate connective tissue and is covered with cylindrical ciliated epithelium. There are probably no glands in the mucosa.

PAROVARIUM.

This structure lies between the outer part of the Fallopian tube and the ovary in the broad ligament on each side.

It is somewhat triangular and consists of a series of parallel tubes or bands of fibrous tissue—from ten to thirty in number.

The outer ones are mostly atrophied fibrous bands, the inner are tubes lined with columnar ciliated epithelium. Along the lower ends of the tubes runs a longitudinal tube which may be solid in its inner part; this is the duct of Gartner, which in the sow and cow runs down the side of the uterus and vagina. It corresponds to the *vas deferens* in the male.

The parovarium is also called the organ of Rosenmüller.

OVARIES.

There are two, one on each side. Each is somewhat oval-shaped and flattened being about $1\frac{1}{2}$ inches in length, $\frac{3}{4}$ inch in width, and $\frac{3}{8}$ inch in thickness. It is attached to the posterior layer of the broad ligament towards its outer part, at about the brim level. They lie more or less vertically, the outer end being uppermost, but many variations in position are found. There are two surfaces—the superior-internal and the inferior-external, and two borders, the anterior (hilum) attached one, the posterior free one.



Fig. 7.—*(Bland Sutton.)*
Ovary, Tube, and Parovarium, from a woman forty years of age.

The Ovary has the following Special Ligaments:—(*a*) *Utero-ovarian ligament* from the inner end of the ovary to the uterus. (*b*) *Ovarian fimbria* already described, page 11. (*c*) The free outer border of the broad ligament—viz., the *infundibulo—pelvic ligament*, helps also to support the ovary.

Structure.—

1. The OUTER COVERING consists of low cubical cells, the remains of the germ epithelium. The junction of this with the peritoneum around the hilum forms a distinct "white line."

2. TUNICA ALBUGINEA. — This is the dense outer part of the ovary proper; it is not found in early life, but is only differentiated as life advances, being especially marked in old women.

3. OVARY PROPER.

(*a*) External cortical layer.

(*b*) Internal medullary layer.

Cortical layer.—This is formed of Graafian follicles lying in a dense stroma of fibrous tissue, with some non-striped muscle. In the outer layer are numerous small follicles; occasionally in this layer a large ripe follicle can be seen bursting through the surface. In the deeper layer are large follicles, those which have grown somewhat. Each Graafian follicle contains an ovum.

The structure of each is as follows—

Externally is a fibrous layer—tunica fibrosa; within this is a more cellular layer—tunica propria; within this is a layer of rounded nucleated cells—membrana granulosa. At one point in the latter the cells are heaped up to form the *discus proligerus*, in which the ovum lies. Within the membrana granulosa, surrounding the *discus*, is the liquor folliculi.

The ovum consists of the *zona pellucida*, the *yolk*, the *germinal vesicle*, and *germinal spot*.

VAGINA.

The vagina is a slit in the floor of the pelvis. It runs from the hymen up to the posterior surface of the cervix uteri, its direction being about parallel with the plane of the pelvic inlet. On vertical mesial section, the shape of the vagina is sigmoid; on transverse



Fig. 8.—*(Henle.)*
Anterior Vaginal Wall, and Multiparous Cervix.
(Looked at from behind.)
a Urethral Orifice. *b* Anterior Vaginal Column. *c* Cervix Uteri.

section in its upper part, it is crescentic, and in its lower part somewhat H-shaped. The widest part of the vagina is its upper portion, the narrowest is just behind the hymen.

The vagina is attached above to the cervix, in front at the junction of the lower third and upper two-thirds, behind at the junction of the lower two-thirds and upper third of the cervix. The upper extremity of the vagina is known as the vault or fornix, and is artificially divided into an anterior, posterior, and two lateral forniees; the posterior is twice the depth of the anterior fornix. The vaginal wall measures in length in front 2 to $2\frac{1}{2}$ inches, and behind 3 to $3\frac{1}{2}$ inches.

Structure.—

1. Inner layer rugose, the folds being transverse, while at the lower end of the vagina, in front and behind, is a single or double mesial fold. This layer is composed of ordinary skin-like stratified epithelium, resting upon a layer of connective tissue which forms papillæ.

2. Outer layer of non-striped muscle, the arrangement of which is disputed. Some say there is an external circular and an internal longitudinal, while, others say the reverse arrangement is the correct one.

The vagina contains very few, if any, glands.

The following points are to be noted:—The walls of the vagina are at all times in apposition, unless artificially separated. The cavity is capable of much distension. The curve of the vagina and its position in the pelvis vary according to the position of the uterus, and the amount of distension of the bladder and rectum.

BLADDER.

The bladder lies behind the symphysis, in front of the uterus and vagina. It varies in shape according to its fulness or emptiness. When empty and non-contracted it lies flaccid, the upper wall resting on the base; in this condition, on vertical mesial section, the



Fig. 9.—*(Fürst.)*

Vertical Messial Section showing Peritoneum.

The dotted line indicates peritoneum. *a* Anus. *b* Vagina. *c* Bladder. *d* Uterus. *e* Below pouch of Douglas. *f* Symphisis Pubis.

cavity along with the urethra forms a Y shape. When empty and contracted it is oval shaped, the cavity being continuous upwards with the urethra. When moderately distended, it is round; when completely distended, it is transversely oval.

Structure.—The upper surface only is covered with peritoneum. The main part of the wall is non-striped muscle. The inner surface is a mucous lining, pink in colour, and thrown into folds save at the trigone; internally, is a layer of transitional epithelium with racemose mucous glands especially near the neck of the bladder; and outside this is a layer of fibrous and elastic tissue.



Fig. 10.—*(Braune.)*
Vertical Mesial Section of Female Pelvic Floor.
(Showing contracted bladder.)
b Lowest dip of peritoneum in front of uterus. *d* Lowest dip behind uterus.
a, *b*, *c*, *d*, Loose extra-peritoneal tissue.

The trigone is a triangular smooth portion of the mucous lining, whose apex is the internal opening of the urethra, and whose base is an imaginary line drawn between the openings of the ureters; each side of this triangle measures about 1½ inches.

Relations.—The bladder is surrounded with loose connective tissue (save above) which attaches it to the uterus and pelvic wall. In front this tissue contains some fat. Through the loose connective tissue run the

strong layers of pelvie faseia whieh support the viscus. The lower part of the bladder is somewhat firmly attaehed to the vagina.

The peritoneal covering is refleeted in front to the back of the upper part of the symphysis, and behind to the eervix at the level of the os internum.

Points to be noted:—The bladder is eonstantly changing in shape. The uterus is normally in eonstant relation to the bladder—*i.e.*, resting against the upper surfaee of the bladder, and is moved through a considerable are of a cirele as the bladder empties and fills.

There is normally no intestine in the utero-vesieal poueh.

URETHRA.

The urethra is in the middle line, elosely adherent to the anterior vaginal wall, extending from the meatus urinarius to the neek of the bladder. It has a slight sigmoid eurve from above downwards, and measures about $1\frac{3}{8}$ inches. It eonsists of an outer museular wall of two layers and an internal mueous lining. In the latter the epithelium of the upper part is transitional, and that of the lower part squamous like the vaginal epithelium. Inside the outer orifice are the openings of Skene's tubules, situated in the lower wall and measuring about $\frac{3}{4}$ inch in length. Skene's tubules are thought to be the lower ends of Gartner's ducts.

URETERS.

From the abdomen they pass into the pelvis (the right lying behind the lower part of the ileum and the left behind the sigmoid flexure, erossing the external

iliac vessels about $\frac{3}{5}$ of an inch below the division of the common iliac artery, passing in front of the internal iliac artery and lying in the space between the internal iliac artery and the external iliac vein. Each one goes downwards and outwards along the pelvic wall until near the ischial spine, where it turns downwards, forwards, and inwards, behind the uterine artery. It then passes through the base of the broad ligament, approaching to about $\frac{3}{5}$ of an inch from the cervix, and runs between the posterior bladder wall and anterior vaginal wall, entering the former from $\frac{1}{2}$ to $\frac{3}{4}$ inch in front of and below the cervix. The ureters then run in the substance of the bladder wall for a little more than $\frac{1}{2}$ inch, and they open into the bladder at the base of the trigone, at a distance from one another of about $1\frac{1}{2}$ inches.

RECTUM.

The rectum or lower end of the large intestine, extends from the left saero-iliac synchondrosis downwards, backwards, and inwards, as far as the third sacral vertebra; it then curves downwards and forwards behind the cervix, and then downwards and backwards to the anus. The first part, from the sacro-iliac synchondrosis to the third sacral vertebra is entirely covered with peritoneum, which forms a mesentery; the second part, from the third sacral vertebra, to a point opposite the tip of the coccyx, is only covered on its anterior surface in its upper part; the third part is, of course, below the peritoneum.

Structure.—The muscular wall is arranged in an external longitudinal and an internal circular layer of

non-striped muscle; inside this is the mucous membrane with a *muscularis mucosæ*.

There are three oblique folds on the inner surface of the bowel to be noted. They are composed of mucous, submucous, and the circular muscular coats. The upper is near the promontory, the lower (valve of Houston or sphincter ani tertius) is about $1\frac{1}{2}$ inches above the anus, and the third is between the two.

In performing the rectal examination it is always well to pass the finger through the sphincter ani tertius. In some cases it may offer considerable resistance to the finger.

The **Anus** is the lowest part of the rectum. It is about 1 inch in length. When it is closed its lateral walls are in apposition. Its muscles are the external and internal sphincters chiefly, with also some fibres of the longitudinal rectal layer.

The **Perineal Body** is the mass of tissue between the vagina and rectum. On vertical mesial section it is triangular in shape, the apex being uppermost. Its vertical measurement is about $1\frac{1}{2}$ inches. It consists of connective tissue, blended fasciæ and muscles of the pelvic floor.

PERITONEUM.

The best idea of this structure is got from a sectional study of the pelvis.

Traced in vertical mesial section, it passes from the anterior abdominal wall above the symphysis or from the upper part of the symphysis to the upper surface of the bladder, then it is reflected to the uterus at the

level of the isthmus, passes over the anterior surface of the uterus above this point and down over the posterior surface as far as the junction of the intermediate and supra-vaginal portions of the cervix, where it passes to the posterior surface of the posterior vaginal wall for $\frac{1}{2}$ to $\frac{3}{4}$ in. It is then reflected to the second portion of the rectum.

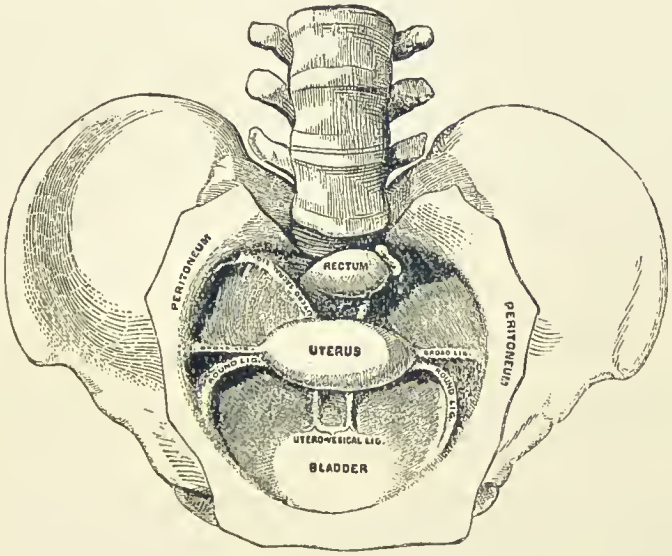


Fig. 11.—*(Hodge.)*
The Reflections and Pouches of the Pelvic Peritoneum.

Traced in vertical sagittal section (passing through ovary), it is reflected from the anterior abdominal wall to the upper surface of the bladder; thence upwards as the anterior layer of the broad ligament, over the Fallopian tube, downwards as the posterior layer of the broad ligament (it does not cover the ovary, it must be remembered) and then to the wall of the pelvis.

Traced in a transverse section of the pelvis, through the broad ligaments and uterus, the anterior and posterior layers of the broad ligaments are seen to be reflected from the side walls of the pelvis and to pass inwards, giving a covering to the anterior and posterior walls of the uterus.

The deepest part of the pelvic peritoneum is the pouch of Douglas. The exact boundaries of this pouch are not clearly defined. By some it is described as that part below the level of the utero-sacral folds; by others, the shelves formed above the utero-sacral folds are also included, thus making the pouch consist of a central and two lateral divisions. Sometimes the pouch of Douglas extends down into the perineal body.

PELVIC CONNECTIVE TISSUE.

This is made up of the strong fasciæ of the pelvis and of the connective tissue under the peritoneum. The latter only concerns our attention here. That which is of special note is the loose connective tissue surrounding the cervix, in the broad and utero-sacral ligaments and at the sides of the bladder and vagina.

VASCULAR SUPPLY OF THE GENITALS.

Arteries.—

The Ovarian Artery, in the pelvis, runs through the upper part of the broad ligament giving branches to tube and ovary. Near the attachment of the round ligament it divides into branches, some of which run

to the fundus, others down the side of the uterus, and a few into the round ligament.

The Uterine Artery runs through the broad ligament from the anterior division of the internal iliac towards the upper part of the cervix, where it turns upwards and runs in a tortuous manner, anastomosing with the descending branches of the ovarian artery. It gives off a branch to the cervix, which anastomoses with a corresponding artery of the opposite side and also with the arteries of the vaginal wall. From the vessels on the outer wall of the uterus branches penetrate the muscle at right angles to the surface.

Sometimes the vaginal arteries arise from the uterine.

The Vaginal Arteries usually arise from the anterior division of internal iliac ; occasionally from the uterine or middle hæmorrhoidal.

The external genitals are supplied mainly by branches of the internal pudic.

Veins. — There is an intricate venous plexus surrounding the uterus, communicating with the pampiniform plexus in the broad ligament and with the vesical and vaginal plexuses. The blood from these veins finds its way into the inferior vena cava. Through the connection of the vaginal with the hæmorrhoidal plexus, and of the latter with the portal system, there is thus formed in the pelvis a communication between the pelvic and portal veins.

Lymphatics. — The lymphatics of the external genitals, and of the lower fourth of the vagina, open into the inguinal glands.

Those of the upper three-fourths of the vagina, and of the cervix, open into the hypogastric glands. Those of the body of the uterus, Fallopian tubes, and ovary open into the lumbar glands.

PELVIC FLOOR.

The pelvic floor is the name given to the complex arrangement of tissues which fill up the outlet of the pelvis. It is studied in two ways :—

1. By Dissection.—The upper surface of the floor is the peritoneal, the lower is the skin surface. Between these are the various muscles, fasciæ, etc., described in the text-books of anatomy.

2. By Frozen Sections—viz., vertical mesial, transverse, and sagittal.

In vertical-mesial section, the floor is seen to extend from the symphysis to the sacrum and coecyx. It is pierced by the urethra, vagina, and rectum.

HART calls that portion of the floor in front of the vagina the pubic segment, and that portion behind the sacral segment. There is considerable discussion as to the composition of these portions—*i.e.*, in regard to whether the whole bladder, uterus, and lower part of the rectum really are to be considered as part of the floor.

The pelvic floor as a whole must be studied in relation to intra-abdominal pressure, micturition, defæcation and parturition.

(*a*) Intra-abdominal pressure. This is, of course, resisted by the floor.

(*b*) Micturition and defæcation. The loose tissue around the bladder and rectum allow of the changes in size in these viscera associated with the functions performed by them.

(*c*) Parturition. The consideration of this point belongs to obstetrics.

Pelvic-Floor Projection is the amount of projection of the floor, in the middle line, beyond the conjugate of the outlet. In the nullipara it measures about one inch.

Some Points in the Physics of the Pelvis.—Intra-abdominal pressure.

This is the pressure of the viscera. It is to be remembered that the viscera are always in contact with one another and with the parietes, the opposing surfaces being moistened with serum. For practical purposes, this pressure may be considered as a fluid-pressure, whieh acts at right angles to the surfaee resisting it. The result of this pressure on the pelvie floor, together with the atmospheric pressure on the outside, is to keep its eomponent parts in close contact. In every position in whieh the body may be plaeed the pubic and sacral segments are in apposition—*i.e.*, the vagina remains a closed slit.

In the genu-peetoral position the only ehange is a diminution of the pelvic-floor projection. This oecurs along with an increase in the antero-posterior diameter of the upper part of the abdominal cavity.

If, in the genu-peetoral position the vagina be artificially opened up, air enters it and its pressure eauses the pubic segment to fall forwards and downwards; at the

same time the anterior posterior diameter of the upper part of the abdominal eavity is slightly inereased. The vagina may be said to become "ballooned," its walls being eonsiderably stretched. Similarly, if the anus be opened up the reetum distends with air.

These effeets may be produeed in what is known as the modified genu-peetoral or Sims' position. In this position the patient lies on her left side and ehest; the

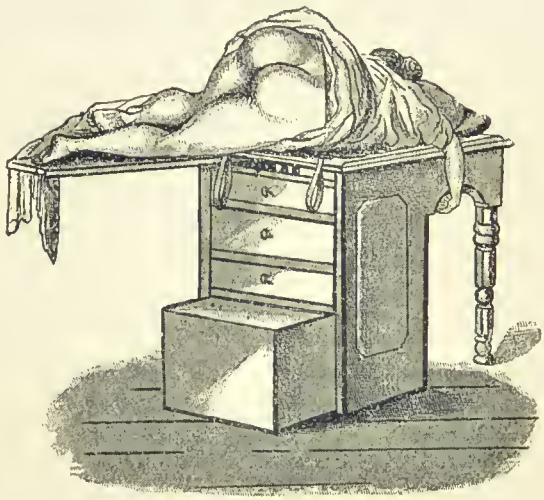


Fig. 12.—*(Pozzi.)*
Latero-Abdominal or Modified Genu-Pectoral Position.
(Patient is on the right side.)

left arm is thrown over the edge of the table; the knees are drawn well up, the right knee resting on the table. The Sims or any spatular speculum used in this position is merely employed to open the vagina and pull baek the perineum, atmospherie pressure eausing the anterior vaginal wall to be pushed forwards and the vaginal cavity thereby well exposed.

The Examination of Gynecological Cases.—

The following case-taking card by Professor A. R. Simpson is the best guide :—

ANAMNESIS.

1. Name ; Age ; Occupation ; Residence ; Married, Single, or Widow ; Date of Admission.

2. Complaint and Duration of Illness.

3. General History of—(*a*) Present Attack ; (*b*) Previous Health ; (*c*) Diathesis ; (*d*) Social Condition and Habits ; (*e*) Family Health.

4. Sexual History.

 (1) *Menstruation*—

 A. Normal — (*a*) Date of Commencement ; (*b*) Type ; (*c*) Duration ; (*d*) Quantity ; (*e*) Date of Disappearance.

 B. Morbid — (*a*) Amenorrhœa ; (*b*) Menorrhagia ; (*c*) Dysmenorrhœa.

 (2) *Intermenstrual Discharge* — (*a*) Character ; (*b*) Quantity.

 (3) *Pregnancies*—(*a*) Number ; (*b*) Dates of First and Last ; (*c*) Abortions ; (*d*) Character of Labours ; (*e*) Puerperia ; (*f*) Lactations.

5. Local Functional Disturbances — (*a*) Bladder ; (*b*) Rectum ; (*c*) Pelvic Nerves and Muscles.

6. General Functional Derangements — (*a*) Nervous System ; (*b*) Respiratory System ; (*c*) Circulatory System ; (*d*) Digestive System ; (*e*) Emunctories.

PHYSICAL EXAMINATION.

1. General Appearance and Configuration.

2. Mammae.

3. Abdomen—(*a*) Inspection; (*b*) Palpation; (*c*) Percussion; (*d*) Auscultation; (*e*) Mensuration.

4. External Pudenda.

5. Per Vaginam—(*a*) Orifice; (*b*) Walls and Cavity; (*c*) Roof; (*d*) Os and Cervix Uteri.

6. Bi-Manual Examination (Abdomino-vaginal, Recto-Vaginal, Abdomino-Rectal, Abdomino-Recto-Vaginal, Abdomino-Vesico-Vaginal)—
 (1) *Uterus*—(*a*) Size; (*b*) Shape; (*c*) Consistence; (*d*) Sensitiveness; (*e*) Position; (*f*) Mobility; (*g*) Relations.
 (2) *Fallopian Tubes.*
 (3) *Ovaries*—(*a*) Size; (*b*) Situation; (*c*) Sensitiveness.
 (4) *Peritoneum and Cellular Tissue.*
 (5) *Bladder.* (6) *Rectum.* (7) *Pelvic Bones.*

7. Use of—(*a*) Speculum; (*b*) Volsella; (*c*) Sound; (*d*) Curette; (*e*) Aspiratory Needle; (*f*) Tent.

8. Physical Changes in—(*a*) Nervous, (*b*) Respiratory, (*c*) Circulatory, (*d*) Digestive, (*e*) Emunctory Organs; (*f*) Skin; (*g*) Bones.

DIAGNOSIS.

PROGNOSIS.

TREATMENT.

PROGRESS AND TERMINATION.

This card consists of two parts—viz., Anamnesis and Physical Examination. The first deals with those facts that the patient can give about herself; the second deals with the methods by which the physician finds out for himself the condition of the patient. The latter heading must be referred to in detail.

1. General appearance and configuration. — These must always be noted.

2. Mammæ.—These sometimes must be inspeeted —*e.g.*, for pigmentation, striæ, etc. They may also require to be palpated.

3. Abdomen. — The methods of examining the abdomen need not be detailed, since the student has already learned them in Clinical Medicine. They are as follows — viz., Inspeetion, Palpation, Pereussion, Auscultation, Mensuration.

4. External Genitals. — The inspeetion of the outer genitals is not done as a routine practice, but only in cases where the other methods of examination fail to make elear a diagnosis.

5. Vaginal Examination. — This should not be done in the case of girls and unmarried women unless absolutely necessary; it should be done with the greatest care and delicacy. In this country the patient lies on her left side with her knees drawn up; in others, she lies on her back. The hands of the examiner must be elean and warmed. The first two fingers of the right hand must be greased or soaped, and passed between the patient's buttoeks, without

soiling the clothes; they are then passed *from behind forwards* over the anus to the anterior edge of the perineum. Then direct the fingers (or only the index finger, if the vaginal orifice is not large enough for both) backwards towards the hollow of the sacrum, pressing back the perineum. Care must be taken not to touch the clitoris, nor to press the anterior vaginal wall against the symphysis. The fingers are then carried up to the fornix vaginæ and cervix.

By this examination, information is acquired regarding the state of the vaginal orifice, the walls, and cervix. Also bodies outside the vagina may be felt if any part of the walls are pressed against by them, and inflammation in neighbouring parts—*e.g.*, the base of the bladder may cause tenderness on vaginal examination, or old cicatricial inflammatory contractions outside the vagina may be felt.

6. **Bi-manual Examination.** — This is the most valuable method of examining the pelvis. The following varieties are employed, viz.—abdomino-vaginal, abdomino-vesical, abdomino-rectal, abdomino-vesico-vaginal, abdomino-recto-vaginal.

The abdomino-vaginal is the ordinary bi-manual examination used. The most valuable method for general pelvic examination is the abdomino-recto-vaginal, but it is usually only necessary when the abdomino-vaginal examination is not satisfactory; moreover, patients do not care for the method, as a rule, owing to the discomfort it often causes. It is best of all employed when an anæsthetic is given.

In performing the ordinary bi-manual examination, the fingers of the right hand are introduced as if for

vaginal examination. The patient then turns on her back and draws her knees up (she is covered with a large wrap during the examination). The left hand is placed on the abdomen, just below the umbilicus. The inner hand is then rotated backwards, and then pushed upwards, the fingers pressing up the cervix. The outer hand is then depressed until the abdominal

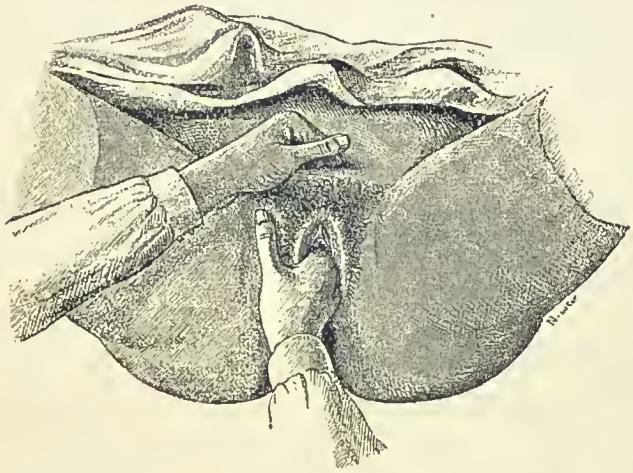


Fig. 13.—*(Pozzi.)* Bi-manual Examination.

wall is pushed against the parts elevated by the inner hand, the patient being directed, all the while, to breathe quietly, and to make no straining efforts. It is always best to make out the condition of the uterus first; afterwards the appendages, ligaments, peritoneum, connective tissue, and viscera, should be examined in detail.

Where satisfactory examination is impossible, owing to the thickness of the abdominal walls, the straining of the patient, or other cause, it is always best to anæsthetise the patient.

When the abdomino-recto-vaginal examination is to follow the abdomino-vaginal, the middle finger may be withdrawn from the vagina and passed into the rectum. This finger should not be re-introduced, of course, without a thorough washing.

7. **Rectal Examination** by one or two fingers may be employed alone in some cases, especially for the determination of the condition of the lower part of the bowel.

8. **Vesical Examination** by the little or index finger is employed in some cases. It is best to dilate the urethra gradually with Hegar's dilators until the index finger can be admitted. The strictest antiseptic precautions must be used.

9. **Use of Instruments.**

(*a*) SPECULUM.



Fig. 14.—SIMS' SPECULUM.

There are three types:—

Spatular—*e.g.*, Sims', Simon's.
Tubular—*e.g.*, Fergusson's.
Valvular—*e.g.*, Cuseo's, Neugebauer's, Barnes'.

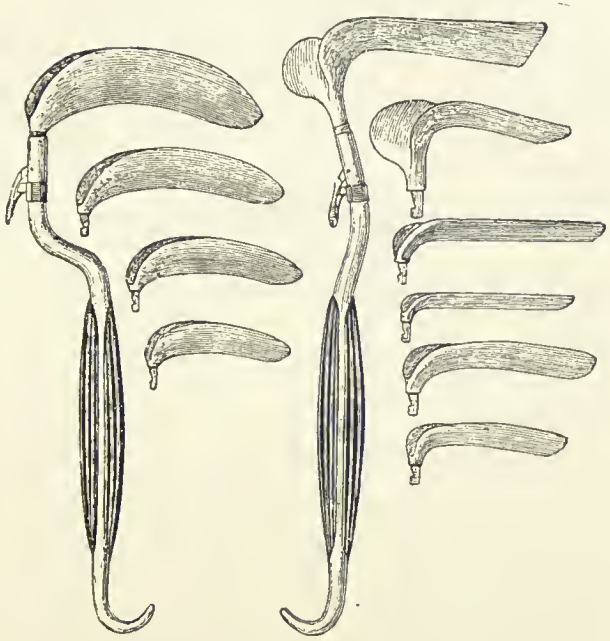


Fig. 15.—Simon's Speculum.



Fig. 16.—Fergusson's Speculum.

Of these forms the spatular is the most valuable for all purposes. The speculum is used for the purpose of examining the vagina and the vaginal portion of the cervix, and also for carrying out operative procedures.

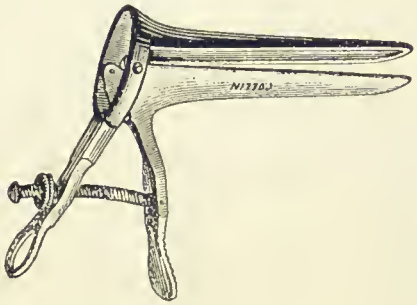


Fig. 17.—Cusco's Speculum.

(*b*) Volsella.

The volsella is really a pair of forceps. There are several varieties in use, *e.g.*, A. R. Simpson's, Hart's, etc. Its chief use is to hold, or pull down the cervix for examination or operative purposes. It should not

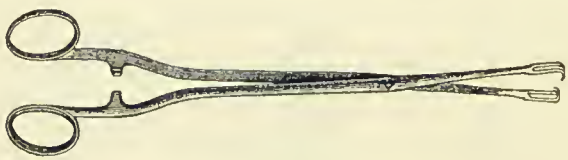


Fig. 18.—Volsella.

be used in any severe acute inflammation in the uterus, appendages, peritoneum, or cellular tissue ; neither in hæmatocele, hæmato-pyo-salpinx, nor in advanced carcinoma uteri.

(*c*) Sound.

The two best sounds are Sir J. Y. Simpson's and A. R. Simpson's.

It should not be passed during menstruation, or in pregnancy: nor in acute inflammation in uterus, appendages, peritoneum, or cellular tissue; nor in carcinoma uteri. Before using it be sure that the patient is not pregnant; do a careful bi-manual examination; curve the sound according to the flexion of the uterus.



Fig. 19.—Sir J. Y. Simpson's Sound.

The sound may be passed with the patient in the lateral or lithotomy position. The instrument is used to determine the length of the uterus, the lie of the uterus, the amount of flexion in it, tenderness or roughness of the walls, stenosis or atresia of os externum and os internum; it is used to diagnose between inversion of the uterus and uterine polypus. It is also employed in dilating strictures of either os, in replacing retroverted unfixed uterus, in making applications to the endometrium. When the sound is in the uterus, the patient being in the dorsal position, the ordinary bi-manual may, in some cases, be employed with greater advantage than where the sound is not used. For this purpose the A. R. Simpson sound is necessary; the handle is held against the palm of the hand whose fingers are in the vagina.

(*d*) Uterine Dilators.

1. *Slow Dilators.* — For slow dilatation of the cervix, sponge, tangle, and tupelo tents are used. They are much less used than formerly, owing to the danger of septic infection from their employment. They increase in size through absorption of fluid.

2. *Rapid Dilators.*—Hegar's graduated vulcanite dilators are the best. Metal dilators with expanding blades—*e.g.*, Sims', Ellinger's, etc., are also serviceable.

All dilators must be used under strict antiseptic precautions.



Fig. 20.—Compressed Sponge Tent.

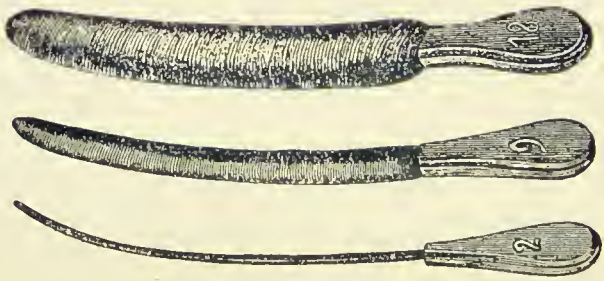


Fig. 21.—Hegar's Dilators.



Fig. 22.—Ellinger's Dilator.

(*e*) Curette.

This is an instrument for scraping the uterine cavity. There are many varieties—*e.g.*, Recamier's, Thomas', Martin's etc. Of all the forms, Martin's is the best.

10. **Physical Examination** of the nervous, respiratory and other systems. The student has already



Fig. 23.—Martin's Curette.

learned the methods of examining these systems in clinical medicine.

PELVIC PERITONITIS.

Perimetritis: Pelveo-peritonitis.

An inflammation of the pelvic peritoneum, acute or chronic. In bad cases there is usually cellulitis under

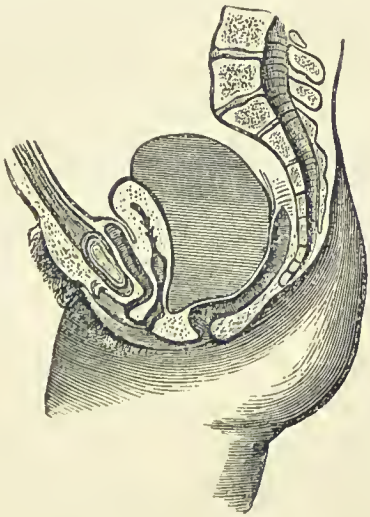


Fig. 24.—*(Schroeder.)* Pelvic Peritonitis.
Serous exudation behind Uterus.

the affected peritoneum. The inflamed area may be of slight or of considerable extent.

Pathology.—Congestion of peritoneum, separation of some of endothelial cells, proliferation of others, exudation of leucocytes and young connective tissue corpuscles, deposit of fibrinous material on the surface, pouring of serous fluid into the peritoneal cavity, where it is either free or surrounded with inflammatory adhesions; finally, the inflammatory products may suppurate.

All these stages do not occur in every case. All variations are found both in regard to extent and degree of affection. Roughly speaking, peritonitis is divided into the four varieties, simple, adhesive, serous, and purulent.

Causes.—1. Spread of inflammation from other tissues and organs of pelvis—*e.g.*, cellulitis, salpingitis, ovaritis, etc.

2. Swellings and new growths, simple, and malignant, growing in connection with pelvic organs and tissues—*e.g.*, hæmatocele, ovarian tumour, tubercle, carcinoma, etc.

3. Abortion, premature and full-time delivery, injury, faulty antiseptics.

4. Gonorrhœa and latent gonorrhœa in the male.

5. Cold and damp, especially during menstruation.

6. Introduction of germs in use of instruments as a result of deficient care in regard to cleanliness.

Symptoms and Physical Signs.—

I.—IN ACUTE PERITONITIS.

Symptoms.—Pulse at first quick, full, and bounding; later, small and very rapid, hard, wiry or thready;

temperature rises early and continues more or less elevated; there are usually rigors; pain of burning, cutting, boring, or shooting nature; vomiting often.

Physical Signs.—Abdomen tense, may be distended. Patient often lies with both legs drawn up. Pain on palpation. Vagina hot and tender. After exudation has occurred one of the following conditions may be found:—

1. Free serous fluid in peritoneal cavity. Indistinct boggy fulness on bi-manual examination.

2. Exudation around uterus in the form of a hard deposit. On vaginal examination cervix feels as if surrounded with plaster of Paris.

3. Encysted serous fluid—

(*a*) Behind uterus. Felt as a rounded mass pushing uterus forward.

(*b*) Behind either broad ligament.

II.—CHRONIC PERITONITIS.

May follow acute peritonitis or develop gradually itself.

Symptoms. — These vary greatly. Pain — dull, dragging, or sharp, in the back or sides; often worse after exertion, during coitus or defæcation; menstrual disturbances; sterility; depressed health; often reflex disturbances.

Physical Signs.—Affected parts tender to touch; thickenings and adhesions may be present. Uterus and appendages displaced in various ways by adhesions.

Course and Results.—Acute form may get well or become chronic; the latter may remain long. Serous exudation is usually absorbed, pus sometimes; but more often it perforates intestine, bladder, or vagina.

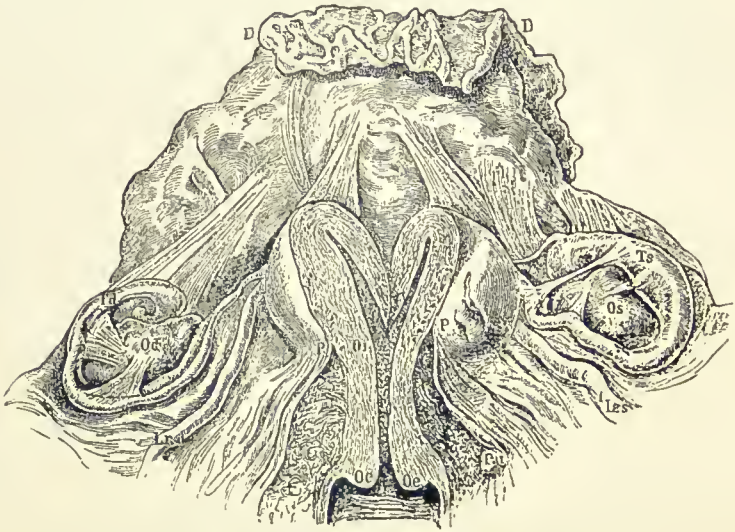


Fig. 25.—*(Bandl.)*

Preparation, from a woman thirty years old, who had been delivered a number of years previously. It shows residues around the Cervix, in the Parametrium and Pelvic Peritoneum.

Prognosis.—Pelvic peritonitis seldom fatal unless septic. When chronic, sterility may be caused by inflammation spreading to tubes or ovaries, or by adhesions interfering with their proper action. The woman's life may be made miserable.

Treatment.—

I.—IN ACUTE CASES.

1. *General.*—Rest in bed; milk, potash, soda, or Seltzer water; peptonised beef-jelly, or beef-tea if

patient be weak, as well as brandy, champagne, or whisky; give early a free aperient dose—*e.g.*, castor oil with laudanum; keep down pain with morphia; if there be a pus present large quantities of alcohol, —*e.g.*, ten to eighteen ounces of brandy in twenty-four hours may be required. To lower temperature use quinine or antipyrin.

2. *Local.*—Hot fomentations every two hours, hot douche. Exuded serous fluid which does not readily absorb and which causes pressure trouble may be tapped. Purulent fluid may be tapped through posterior fornix or sometimes laparotomy may require to be done, the peritoneum being washed and drained. When the patient becomes convalescent, nourishing and easily digested food, wine, tonics, etc., to be given to restore strength. She should avoid cold and damp, and should wear a flannel binder after a bad attack for several months.

II.—IN CHRONIC CASES.

1. *General.*—Get the general health improved; attend to stomach and bowels; lessen the work; forbid coitus; send patient away for change if she is much run down; if she be markedly neurotic employ Weir-Mitchell treatment.

2. *Local.*—Hot douche, hot hip-baths, glycerine plugs in vagina, blistering above Poupart's ligament.

TUBERCULAR PERITONITIS.

Pathology.—In some cases there are many tubercle nodules scattered over the peritoneum with abundant serous effusion and few or no adhesions; in other cases

there may be great matting together of viscera, the omentum often being much thickened and gathered into a mass.

Symptoms.—If there be no tuberculosis elsewhere they may be slight; there may be gradual wasting and little or no elevation of temperature.

Treatment.—Laparotomy with removal of the fluid and drying of the peritoneal cavity thoroughly, has done well in many cases.

MALIGNANT PERITONITIS.

Pathology.—In the majority of cases secondary to malignant disease in the ovaries or to rupture of papillomatous cysts.

Symptoms.—At first no marked symptoms; later cachexia, and in latest stages more or less pain. Blood-stained fluid containing cell-groups distends the abdomen; irregular masses may be felt, and enlargement of pelvic or iliac glands.

Treatment.—Tap the abdomen from time to time; keep up the strength as much as possible.

PELVIC CELLULITIS.

Parametritis.

Nature.—Inflammation acute or chronic, affecting the pelvic cellular tissue, especially that in the bases of the broad ligaments and in the utero-sacral folds.

Pathology.—There is at first thickening in the part affected, followed either by pus-formation, or by

gradual resolution and shrinkage or cicatrisation. The latter condition is a common cause of uterine displacements.

Causes.—

1. Secondary to peritonitis in some cases.
2. Cold during menstruation.
3. Septic matter introduced by instruments in operating on uterus.
4. Following abortion, premature and full-time labours, septic matter entering some raw surface through imperfect antiseptic measures.

Symptoms.—In an acute onset there is usually a rigor; pain in the pelvis; temperature elevated. When there is marked exudation patient may lie with leg drawn up on side affected.

In chronic cases, pain and discomfort in the pelvis are the chief symptoms; there may be the same reflex disturbances as in chronic peritonitis.

Physical Signs.—

I.—IN ACUTE CASES.

Pain on palpating lower part of the abdomen; some pain caused on vaginal examination; elevated temperature; inflammatory exudation, simple or purulent, may be felt in the following places:—

1. In either broad ligament in its lower part, pushing uterus towards opposite side and bulging down the fornix.
2. In upper part of either broad ligament.
3. In iliac fossa.
4. Behind uterus (rare).
5. Between uterus and bladder (rare).

Exudations spread both by lymphaties and by lines of cleavage—very loose eellular tissue. Thus König has shown that—

1. Exudation in upper part of broad ligament passes out and then along psoas-iliaeus and sinks below the brim.

2. Exudation in lower and anterior part of broad ligament passes out to wall of pelvis at side of uterus and bladder, along the round ligament, and thence by Poupart's ligament to the iliae fossa.

3. Exudation in lower and posterior part of broad ligament fills tissues around Douglas' poueh and then passes outwards as in 1.

II.—IN CHRONIC CASES.

Thiekenings, or cicatrisation in the parts affeeted, tender to the toueh; associated with displacement of uterus and appendages.

Course and Results.—Inflammation may pass entirely away; may remain ehronie; pus may open into bowel, bladder, or vagina, pass beneath Poupart's ligament or upwards around behind kidney, or more rarely burrow to perineum or through sciatie noteh into buttock; very rarely into peritoneal eavity.

Prognosis.—It depends on severity of attaek and patient's eondition. May give rise to long-eontinued suffering and lead to sterility.

Treatment.—General and loeal as in pelvic peritonitis. Pus eollections are to be opened and drained antiseptieally.

PARAMETRITIS CHRONICA ATROPHICANS.

I.—CIRCUMSCRIPTA. II.—DIFFUSA.

Parametritis Chronica Atrophicans Circumscripta.—A circumscribed chronic inflammation affecting mainly the denser bands of connective tissue. The cause may be due to ulceration in the bladder, in which case thickened bands occur in the para-vesical tissue which atrophy and cause uterine displacement; or to ulceration in rectum, causing the condition in the utero-sacral folds or to split cervix, giving rise to bands in the base of the broad ligament, which, on shrinking, displace uterus and compress veins leading to cervical congestion and catarrh.

Parametritis Chronica Atrophicans Diffusa.—A fibroid change in the entire pelvic cellular tissue; vessels are compressed giving rise to congestion and catarrh of urethra, bladder, rectum, and uterus; external and internal genitals gradually atrophy. Menstruation is at first profuse and afterwards scanty. The cause is not clearly known. It may be due to frequent child-bearing and excessive suckling.

From both varieties of parametritis atrophicans there may be various reflex disturbances:—

Cerebral.—Neuralgias and headaches.

Spinal.—Pain over vertebræ, in costal regions or in the extremities.

Sympathetic.—Pain in bowels, stomach, bladder; heart-palpitation, etc.

Treatment.—Treat the cause in the circumscribed form; improve the general health; hot hip-baths and hot douche; massage.

PELVIC HÆMATOCELE AND HÆMATOMA.

Nature.—Hæmatocele is an effusion of blood into the peritoneal cavity, hæmatoma an effusion into the cellular tissue; the former is an intra-peritoneal, the latter an extra-peritoneal hæmorrhage.



Fig. 26.—*(Schroeder.)* HÆMATOCELE from Ruptured Tubal Pregnancy.

a Pouch of Douglas. *bc* Coagulated blood. *bf* Fluid blood.

They are most common between the ages of 25 and 35—the period of vigorous sexual life, and are more frequent in parous than in nulliparous women.

Causes.—Violent exercise—*e.g.*, dancing; washing during or near the menstrual period; coitus during menstruation; excessive menstruation; scorbutus; hæmophilia; purpura; varicose sub-peritoneal veins.

Sources of the Blood.—

1. Sub-peritoneal veins.
2. Veins of connective tissue.
3. Regurgitation, in excessive menstruation, along the Fallopian tubes.
4. From vessels in false membrane of a peritonitis.
5. Rupture of a tubal pregnancy.

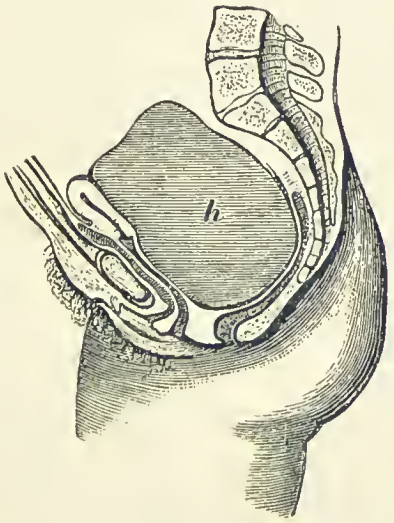


Fig. 27.—*(Schroeder.)* Hæmatocele.
h Blood-Collection behind Uterus.

Symptoms.—These vary according to the position and extent of the hæmorrhage; they are more severe in hæmatocele than in hæmatoma as a rule. The usual

symptoms are sudden onset, sudden pain in the pelvis, pallor, quick, feeble pulse; in bad cases collapse, faintness, vomiting, dimness of vision. In some cases, also, menorrhagia is present.

After acute stage has passed off, patient complains of weakness, sometimes of pains in the pelvis; there may be frequency of micturition or retention, pain and difficulty in defæcation, according to the pressure of the effused blood on bladder and rectum.

Physical Signs.—

I.—IN HÆMATOCELE.

The blood-mass may be felt bi-manually filling the pelvis, and reaching above the brim, it may be, as far as the umbilicus. The uterus may have been pushed forwards and elevated, so that it lies behind the symphysis and anterior abdominal wall, it may be upright in the very centre of the blood-mass, or it may be retroverted and pushed downwards, the blood-mass resting upon it.

II.—HÆMATOMA.

When the effusion is in a broad ligament, the mass is felt especially on one side, the uterus being pushed towards the opposite side of the pelvis, and the fornix on affected side bulged downwards.

When the effusion has spread all around the uterus, there is bulging down of the whole vault of the vagina.

When the effusion is chiefly around rectum, a retro-uterine tumour is felt pushing the uterus forwards.

Differential Diagnosis.—

1. Pelvic peritonitis with effusion.
2. Pelvic cellulitis.
3. Fibroid; fibroid with peritonitis or cellulitis; fibroid with twisted pedicle.
4. Ovarian tumour behind uterus; ovarian with peritonitis; ovarian with twisted pedicle.
5. Retro-displacements of gravid or non-gravid uterus.
6. Hæmato-salpinx.
7. Retained menstrual blood in atresia of vagina or cervix, or in horn of a malformed uterus.
8. Extra-uterine pregnancy.

Course and Results.—The effusion may be so great that death results. Hæmorrhage into the connective tissue may be followed by rupture into the peritoneal cavity. At first the blood is fluid; it then organises into a mass, which is solid or containing one or more cavities, and having a somewhat elastic feeling. Usually the intra-peritoneal blood gets enclosed in false membrane caused by peritonitis. Absorption and disappearance may follow, though often only after many weeks, or suppuration may occur and the pus may burst through bladder, bowel, vagina, or into the peritoneal cavity.

Treatment.—

I.—IN EARLY STAGE.

Rest in bed; easily digested food, chiefly milk; ice-bags to abdomen; hypodermics of ergotine; if patient collapsed, give brandy and ether, and put mustard-poultice over epigastrium. If certain that the cause is ruptured extra-uterine gestation, perform laparotomy,

tie the bleeding points, remove the gestation sac if possible, or, if not, remove fœtus, and stitch the sac into abdominal wound, and drain.

II.—LATER.

Rest in bed; ergot by mouth; ice-bags to abdomen; nourishing, easily digested food.

III.—WHEN SUPPURATION OCCURS.

Open and drain through the vagina, above Poupart's ligament, or by laparotomy.

Other Affections of the Pelvic Peritoneum and Connective Tissue.—

Swellings found in Broad Ligaments.—Inflammatory and blood collections, cysts, fibroma, fibro-myoma, cancer, sarcoma, tubercle.

Swellings found in Round Ligaments.—Inflammatory deposits, fibroma, fibro-myoma, sarcoma, hydrocele.

HYDROCELE OF THE ROUND LIGAMENT.

Fluid in the canal of Nuck—a tube of peritoneum extending into the labium majus; it may communicate with peritoneal cavity, or be closed at internal inguinal ring. It must be diagnosed from ovary prolapsed in inguinal canal and from inguinal hernia.

In the rest of the pelvic connective tissue, fibroma, fibro-myoma, and sarcoma may occur; the latter being found sometimes in the recto-vaginal septum.

Echinococci may be found in ovary of the pelvic organs or tissues.

AFFECTIONS OF THE FALLOPIAN TUBES.

ABNORMALITIES.

Excessive length; unequal size; accessory fimbriated ostia; absence of fimbriæ; imperfect development; displacement; non-apposition of fimbriæ to ovary.

STRICTURE AND OCCLUSIONS OF THE TUBES.

These may be congenital; they may be caused by inflammation or tumours in the tube, or outside the tube, peritonitis being an important cause. The stricture may occur at the outer, middle, or inner part; in the latter, it may be caused by uterine inflammation.

Stricture and occlusion are of importance in relation to sterility and to the accumulation of fluid in the tubes outside the obstruction.

INFLAMMATION OF THE TUBES. (SALPINGITIS.)

There are three varieties—

1. Peri-salpingitis.
2. Meso-salpingitis.
3. Endo-salpingitis.

Causes of Salpingitis.—Chill; excessive coitus; excessive exercise during menstruation; typhus, cholera, and acute exanthemata; gonococcus; tubercle bacillus; actinomyces bovis; septic germs; and acute inflammation in neighbouring parts. The most frequent causes are gonorrhœa and inflammation following abortion or labour.

Pathology.—

I.—PERI-SALPINGITIS.

This is really an inflammation of the peritoneum covering the tubes; it may be part of a wide-spread peritonitis or merely local. It may cause bending, stricture or displacement of the tube, or may lead to adhesions with other structures; outer end may become closed.

II.—MESO-SALPINGITIS.

This usually occurs more or less with peri- or endo-salpingitis; a small-celled infiltration occurs among the muscular fibres, the wall becoming thicker and harder.

III.—ENDOSALPINGITIS.

In one form is found marked infiltration of the mucous membrane and its folds; increased mucous secretion is produced, often abundant, and containing fatty granular cells, and shed epithelial cells, sometimes corpuseles. The tubes become thickened and more blood or less tortuous; later on, the museular wall thins and the tube may get distended.

In another form the small-celled infiltration is greater, spreading among the muscle layers; there is

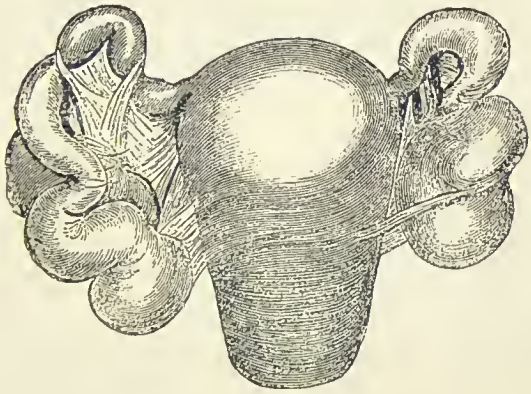


Fig. 27.—*(Heitzmann.)*
Tubal Catarrh, with Rosary form of the Tube and Perisalpingitic Adhesions.

marked congestion of the vessels and ecchymoses; the lining epithelium is destroyed, the folds appearing ragged; adhesions between folds may eause eavities in wall filled with mucus or pus; also tube may get divided into eompartments; outer end of tube usually gets elosed, the fimbriæ often entering the lumen of the tube and growing together.

HYDRO-SALPINX.

Distension of the tube with serous fluid poured forth as a result of catarrh, the outer and inner ends having been closed, The tube becomes elongated and tortuous, sausage-shaped with constrictions; it may reach the size of a child's head; it may have one or more cavities; and may be bi-lateral. In some cases the uterine end may only be narrowed, not completely closed, and fluid may escape into uterus. Rupture into peritoneum may occur without causing a fatal issue.

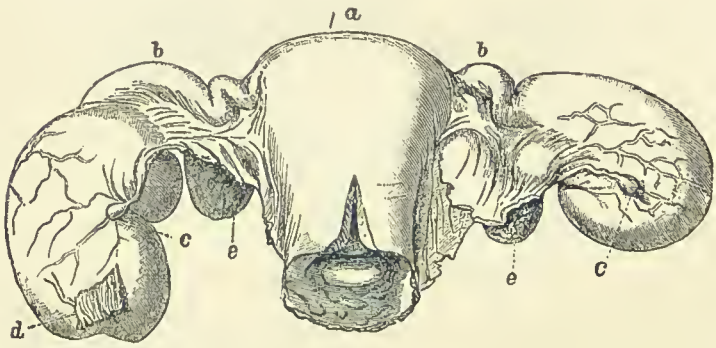


Fig. 28.—*(Hennig.)* HYDROPS TUBÆ.

a Uterus (cervix split in front.) *b b* Fallopian Tubes. *c c* Terminal Cysts. *d* False band adherent to the tumour of the right side. *e e* Ovaries.

PYO-SALPINX.

Distension of the tube with pus caused by inflammation. There may be one or more large divisions of the lumen with smaller collections in the wall. It may be produced rapidly by acute inflammation or

slowly by chronic. It may burst into peritoneum, setting up fatal peritonitis, or into bowel, vagina,

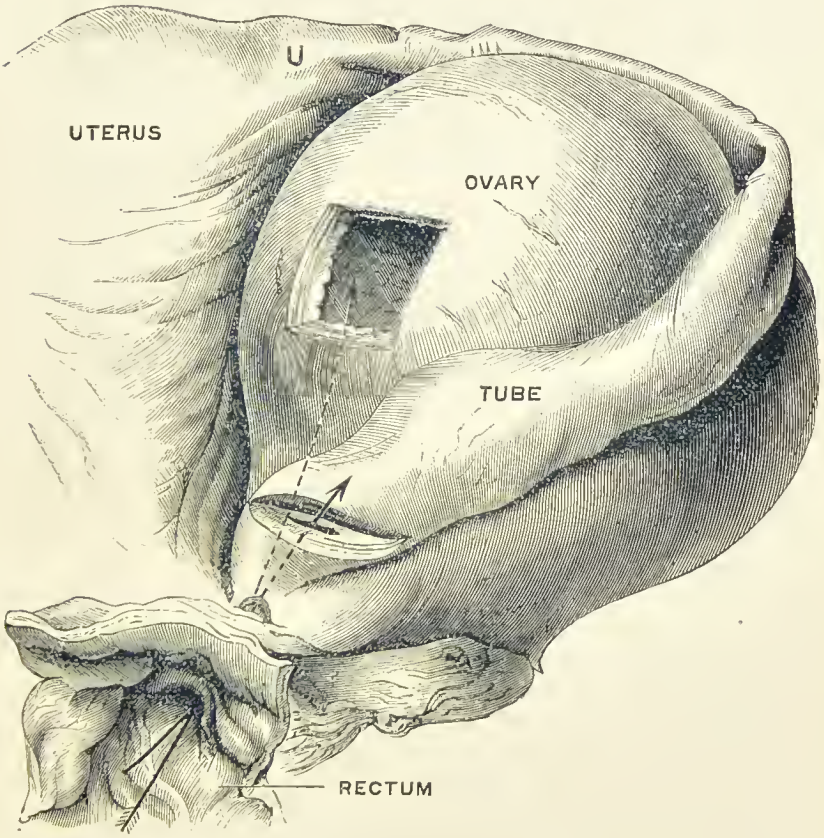


Fig. 29.—*(Bland Sutton.)* Large Pyo-Salpinx.

The tube communicates with an abscess in the ovary (tubo-ovarian abscess), and each communicates with the rectum.

abdominal wall, or uterus. The shape of the tube is the same as in hydro-salpinx.

Symptoms. — Not well defined. Pain in side affected, occuring at first occasionally, and afterwards, it may be, constantly, worse at menstruation and often on coitus; menorrhagia, often metrorrhagia; sterility, when inflammation is bad and bi-lateral; when large and adherent, symptoms of pressure on bladder or rectum may be caused; in pyo-salpinx small drops of pus may get to peritoneum from time to time, setting up localised peritonitis. Some cases of hydro-salpinx may last for years and cause no symptoms.

Differential Diagnosis of Hydro-Salpinx and Pyo-Salpinx.—

1. Sub-peritoneal fibroid of uterus.
2. Inflammatory or blood exudation in broad ligament.
3. Broad ligament cysts.
4. Small ovarian tumours.
5. Tubal or cornual pregnancy.
6. Retained blood in malformed uterus.

Treatment.—

I.—OF SALPINGITIS.

Hot douche; hot hip-baths; blisters in iliac regions; potassium iodide and bromide inwardly; removal by laparotomy in bad cases.

II.—OF HYDRO-SALPINX AND PYO-SALPINX.

Remove by laparotomy; if swelling cannot be removed, remove contents, thoroughly wash out and stitch to abdominal incision.

HÆMORRHAGE INTO THE TUBES.

Small hæmorrhages occur in cholera, typhus, small-pox, puerpera, puerperal diseases, heart-disease, and liver-disease, but are of no practical importance.

Hæmato-salpinx.—A large collection of blood in the tube is a serious condition. It may result, when one or both ends of the tube are closed, from marked congestion of the mucous membrane; chiefly from retained menstrual blood in atresia of vagina, or cervix, or in malformed uterus. The shape of a hæmato-salpinx is like that of hydro-salpinx. The blood may remain fluid for a long time. As it increases the tube-wall thins; adhesions form between it and surrounding parts. Rupture may occur into the cellular tissue, into peritoneum, or into any structure with which adhesions form.

NEW GROWTHS OF THE TUBES.

Fibroma, fibro-myoma, lipoma, carcinoma, tuberculosis. Tuberculosis may occur primarily; or along with a like affection of the other genitals, or secondary to tubercle elsewhere. The tube-wall becomes thickened with infiltration, the tubercle nodules breaking down and filling the tube with cheesy matter. Carcinoma is rarely primary but usually secondary to cancer of uterus, ovary, or peritoneum.

Cysts are found in connection with the tubes. Small ones occur in mucous membrane or under the peritoneal covering. The so-called *tubo-ovarian cysts* are of two kinds—those resulting from adhesion of outer end of tube to ovary, and those from an ovarian sac of peritoneum, sometimes found in women, into which the tube opens.

AFFECTIONS OF THE OVARY.

MALFORMATIONS.

Absence of one or both; partial development; supernumerary ovaries.

OVARITIS.

(Oöphoritis.)

Inflammation of the ovary may be acute or chronic.

I.—ACUTE OVARITIS.

1. *Follicular or Parenchymatous Form.*—Ovary slightly enlarged; Graafian follicles swell, their contents becoming cloudy or purulent; the cells of membrana granulosa and discus, and the ovum becoming degenerated, the zona pellucida getting thickened and folded; germinal epithelium on surface may break down. Thus follicles get destroyed.

2. *Interstitial Form.* — Vessels are congested; connective tissue becomes infiltrated; small ecchymoses may occur and also pus; follicles in affected part may be attacked and destroyed; afterwards ovary may become shrunken.

II.—CHRONIC OVARITIS.

Ovary usually larger than normal; in advanced cases may be smaller. Surface irregular and hard; stroma cirrhotic; follicles destroyed or filled with turbid, colloid, or bloody fluid; hæmorrhages in the substance; abscesses may form. Usually there is peri-ovaritis associated.

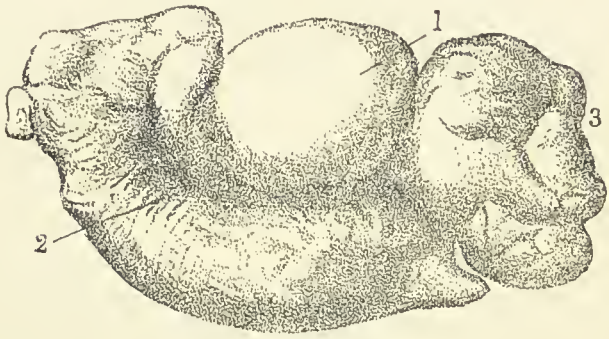


Fig. 30.—*(Pozzi.)*

SALPINGO-OVARITIS AND SMALL PAROVARIAN CYST.

1 Parovarian Cyst. *2* Thickened Tube. *3* Ovary.

Causes of Ovaritis.—

1. Septic infection following abortion; premature labour; full-time labour; the use of dirty instruments in the genital tract.
2. Acute fevers.
3. Arsenic and phosphorus poisoning.
4. Chill at menstrual period.
5. Peritonitis.
6. Gonorrhœa.
7. Latent gonorrhœa in the male.

Symptoms and Physical Signs.—

In Acute Ovaritis.—There is severe pain in the region affected, which may radiate. It is difficult, however, to distinguish this from the pain due to the peritonitis which is generally present. On physical examination, the ovaries are found extremely painful to the touch, and enlarged.

In Chronic Ovaritis the symptoms are variable. There may be a somewhat sharp or dull pain, felt worse after coitus, straining at stool, or hard work; often worse at the onset of menstruation; menstrual discharge often increased, sometimes lessened.

Of great importance are the general changes so often associated with chronic ovaritis. Patients lose their appetite, sleep badly, get run down, complain of pains in various parts of the body. Many forms of hysterical manifestations may be found.

Course of the Disease.—It may pass entirely away; may remain chronic, adhesions taking place between the ovary and neighbouring structures—*e.g.*, tube, broad ligament, uterus, bowel, pelvic floor; several small abscesses may form, or one may increase and occupy the whole ovary, sometimes bursting into the peritoneum, bladder, etc. Sterility often follows double ovaritis.

Treatment.—

In *acute* cases—blister iliac region on affected side, and use the hot vaginal douche; move bowels freely; rest. When much peritonitis is present the treatment is that of peritonitis.

In *chronic* cases—blisters, hot douches, hot hip baths, vaginal glycerine plugs; bromide and iodide of potassium internally. Franzensbad and Kreuznach baths. Sexual rest necessary; work to be avoided as much as possible. Where pain or menorrhagia cannot by these means be checked, oöphorectomy can be performed.

HERNIA OF THE OVARY.

The ovary may be found in the inguinal canal, in the obdurator foramen, or as part of an abdominal hernia. It may be single or double, and in most cases of inguinal hernia is congenital. The latter may be mistaken for a hernia of bowel or omentum or for a hydrocele of the round ligament. The ovary is usually adherent. As to treatment nothing may be required; a protecting cap may be worn or the ovary may be removed if much pain is caused. Some authors think that most cases of so-called congenital hernia are really cases of undescended testicle, which may sometimes be found in women with well-formed genitals.

PROLAPSE OF THE OVARY.

1. Behind the lower part of the broad ligament.
2. In the pouch of Douglas.
3. In the utero-vesical pouch.
4. In the depression of an inverted uterus.

Causes.—A fall, or sudden jump or jolt may cause the condition. Probably most cases occur during the weeks following labour; during pregnancy the ovaries are enlarged and their ligaments become softened and stretched. Retroversion or retroflexion of the uterus drags down the ovaries. Inflammatory adhesions may on contraction drag them down. An enlarged ovary tends to sink downwards.

Symptoms. — Pains in the pelvis, increased on coitus or defæcation; a dragging sore feeling; reflex nervous phenomena.

Treatment.—Blisters to iliac regions; hot douches; glycerine plugs; regular opening of bowels. If uterus is retroverted replace it if possible and put in an Albert Smith pessary; or if this causes pain try a ring for a time. Where no improvement results, especially in cases where the ovaries are bound down by adhesions or much changed by inflammation, the question of their removal by abdominal section must be considered.

OVARIAN HYDROCELE.

This is a sac of thin fluid on the posterior aspect of broad ligament. Outer end of Fallopian tube which is elongated and dilated opens into it. Ovary projects on the sac-floor in small cysts, but in large ones it is spread out and blended with sac-wall, in some cases being unrecognisable. The condition is due to the distension of a fold of peritoneum which sometimes covers the ovary—the so-called ovarian sac. (This sac

is constantly found in some mammals — *e.g.*, rats). Occasionally a hydroeele empties itself from time to time through the tube and uterus.

TUBO-OVARIAN CYSTS.

The ovary is changed into a eyst and communicates with a distended tube. The eontents may become purulent.

Treatment.—For both of these conditions abdominal section.

OVARIAN TUMOURS.

I. CYSTOMA.—

Modes of Origin.—

1. Distension and running together of Graafian follicles. Small cysts are formed in this way.

2. Degeneration of youngest or undeveloped Graafian follieles. Probably most of the ordinary multi-locular cysts arise in this way.

3. Development of remains of the Wolffian bodies in the hilum of the ovary. The so-called "papillomatous" tumours of the ovary arise in this way.

4. Malignant disease.

5. Colloid degeneration of ovarian stroma.

6. Certain eellular tubes—which are, according to some, diseased blood-vessels; and according to others derived from the germinal epithelium.

Varieties of Ovarian Cysts.—

1. Hydrops follieulorum.
2. Ovarian eysts.
 - (*a*) Ordinary multi-loeular — from the parenehyma.
 - (*b*) Papillomatous—from the hilum.
 - (*c*) Combinations of these.
3. Dermoid cysts.
4. Malignant cysts.

Hydrops Follieulorum.

There may be one or more (even ten to twenty). They are usually small, rarely becoming as large as a hen's or a goose's egg. Contents are usually thin and serous. When a cyst projeets mueh from the surface, its wall thins greatly. The inner surfaee is lined with eylindrieal epithelium. Ordinarily, these small eysts have no elinieal significanee. Large ones may require ovariotomy.

Ordinary Multi-loeular Ovarian Cyst.

1. *Pedicle.*—This is made up of broad ligament, Fallopian tube, and ovarian ligament.

2. *Cyst Proper.* — Usually irregularly rounded, varying in size. The smaller the tumour, the less the individual eysts of which it is eomposed differ in size; the larger the tumour grows, the more apt is one of the eysts to beeome mueh larger than the others. Thus small tumours are more resistant than large ones, the latter being more elastie, having thinner contents. Large eysts have smaller cysts in and on their walls. Cysts may open into one another.

Mieroscopie appearance. — External eovering consists of eubical or low eells—*not peritoneum;* main part of wall is fibrous tissue; inner covering eonsists of eolumnar or cubical epithelium in one or more layers.

The contents of the cavities vary greatly—thin scrous, thick ropy, glairy, gelatinous or eolloid. The walls may undergo the following degenerative ehanges, —viz., caleification, fatty and atheromatous degeneration. Sometimes solid projections are seen on inner surfaee of cavities (not papillary vegetation); these are mostly thiekenings of the stroma, myxomatous or fibro-sarcomatous masses.

Papillomatous Cystoma.

These do not grow so large as the ordinary eysts. In many cases they are bi-lateral and most of them grow downwards between the layers of the broad ligaments. The number of eavities is small. On the inner wall are found papillary, cauliflower-like growths, which may break through secondary eyst-walls or main wall of tumour. These tumours grow slowly and develop pressure symptoms earlier than in the case of ordinary cysts, on account of their broad ligament development. After puncture they refill quickly. If the papillary growths reach the peritoneum they will grow there, or into other organs.

Usually a bit of the ovary is found on the outer wall of the tumour; there is more or less of a peritoneal covering depending on the extent of broad ligament invaded.

The main part of wall is fibrous; the inner wall being lined with cubical or cylindrical cells more or less ciliated. The fluid contents are rarely colloid.

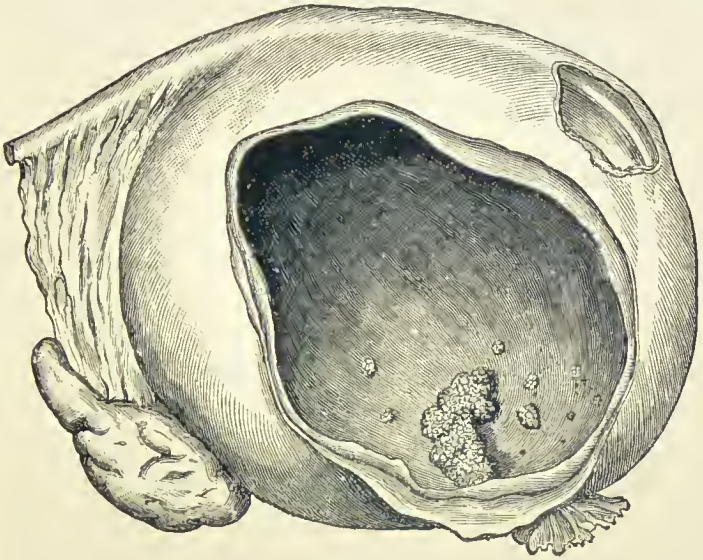


Fig. 31.—*(Doran.)* Broad Ligament.
Papillomatous Cyst growing from Hilum of Ovary.
Cyst is opened into.

Dermoid Cysts.

These are developmental in origin and contain more or less of the constituents of the integument. They are always simple, never proliferating cysts; but one ovary may contain two or three dermoids. Both sides may be affected.

The inner surface has in parts the structure of skin, hairs, sebaceous glands — sweat glands even being found. In the wall may be found teeth, bones, nerves, and muscle.

The eyst usually eontains a thick oily fluid with thrown-off eells and hairs; it hardens on exposure to the air.

Dermoids are the most frequent ovarian tumour met with before puberty.

Malignant Cysts.

These are eystie tumours in whieh malignant disease has oeeurred. It is espeeially apt to oeeur in eonneetion with the papillomatous eysts.

Ovarian Fluid. — It varies greatly in consistence, being thin and watery, serous, viseid and ropy, gelatinous or eolloid. The colour also varies much. The specifie gravity averages in the ordinary eyst 1010 to 1030. It does not eoagulate—unless much blood has got in. Oil globules, cholesterin, epithelial eells, blood corpuscles, and granular eell-debris are found in the fluid.

II. SOLID TUMOURS.

Non-malignant tumours—*e.g.*, fibroma, fibro-myoma are rare. Tubereulosis is found as part of a wide-spread infection.

Malignant tumours—*e.g.*, careinoma and sarcoma—may oeeur primarily in the ovary.

Whether solid or occurring in a cyst, a constant result is the occurrence of ascites, usually blood-tinged, and containing charaeteristic cell groups.

PAROVARIAN CYSTS.

These result from dilatation of tubes of the parovarium. Several small ones may be found, or only one may develop to a large size. A typical parovarian cyst is to be distinguished from an ovarian cyst by the following characteristics: its wall is thin and lined by ciliated columnar or cubical epithelium, papillary formations absent, contents thin and colourless with specific gravity of 1002 to 1008, surface covered with peritoneum which strips off easily, the ovary is intact and often in contact with the cyst; the tumour is usually not pedunculated, though from its bulging it may sometimes appear to have a pedicle.

As it grows it may pass beneath the pouch of Douglas to rectum, cæcum, or colon, and into the broad ligament of the opposite side. The Fallopian tube is usually elongated and closely applied to the cyst. These cysts grow very slowly and may remain stationary for years. They tend to rupture spontaneously without leading to trouble.

OTHER BROAD LIGAMENT CYSTS.

These are mostly derived from relics of the Wolffian body other than the parovarium; when developing near the hilum of the ovary they are very apt to be papillomatous. Unobliterated portions of Gartner's canal, even in the uterine wall, may give rise to these cysts.

The small cysts known as hydatids of Morgagni are unimportant. Cysts in the broad ligament may also be caused by blood or inflammatory effusions.

Symptoms caused by Ovarian Tumours. — The majority grow insidiously, even to a large size, causing no symptoms; often they are only discovered accidentally. Sometimes, however, symptoms are produced, the earliest being vesical tenesmus, constipation or painful defæcation. In some cases pain in the pelvis, abdomen, or back may be complained of; in others, syncope. Menstruation may be disturbed, though usually not to any marked degree. Patient does not feel ill, as a rule, until tumour is very large, interfering with digestion; then she cannot take food well, has dyspepsia, grows weak and loses strength. Œdema of legs, vulva, and abdominal wall may develop. Peritonitis or intra-cystic inflammation may occur. Death occurs gradually from exhaustion.

Sometimes, when the tumour is small, difficulty in micturition or defæcation may be brought about; the tumour may become incarcerated in pelvis, but may rise up into abdomen. The symptoms may be divided into four groups :—

1. *Those produced by the Ovarian Disease per se.*— These mainly refer to menstruation. As a rule menstruation is not interfered with by an ovarian cyst, though all forms of disturbance may be met with. Dysmenorrhœa is very rare. Early menorrhagia is more common; in double broad ligament tumours this as well as metrorrhagia may be marked from interference by pressure with vessels in the ligaments.

Amenorrhœa is often found, but is mostly due to poorness of health; it may be due to pregnancy. Sterility may result from ovarian tumour, though pregnancy may occur with a large tumour or even with bilateral tumours. It must be remembered that ovarian tumours may be accompanied with mammary enlargement and pigmentation and even the secretion of milk.

2. *Those produced by pressure of the Tumour.*—Small incarcerated tumours produce vesical tenesmus and difficulty in defæcation. Large abdominal tumours may, also, by traction on the bladder produced tenesmus. The dull dragging pains complained of with large tumours are due to pressure and traction on the abdominal wall and viscera. As the tumour grows up the stomach may be interfered with and also the lungs. The renal veins may be sometimes compressed. The uterus may be directly pressed upon or may be interfered with by the upward traction of the bladder caused by the tumour.

Hæmorrhoids, varix, and œdema of the lower limbs as a result of compression of the large abdominal veins are rather rare. Ascites is rare except in malignant cases. Umbilical hernia may be caused.

3. *Symptoms due to Complicating Diseases.*—Peritonitis is common. Intestinal irritation and diarrhœa are sometimes caused. Intestinal obstruction may be caused.

4. *General Symptoms.* — General condition is usually good until advanced stages, when tumour presses greatly on stomach and intestines. Marasmus gradually develops.

Diagnosis of Ovarian and Broad Ligament Cysts.

I. Ovarian Cysts.

(*a*) When the tumour is entirely within the pelvis.

I. LATERAL TO THE UTERUS.

Physical Signs.—Bi-manually a firm, rounded, elastic mass is felt at the side of the uterus, moveable unless incarcerated or bound by adhesions. The uterus is displaced towards the opposite side and can be moved apart from the tumour unless adherent to it. Sometimes a feeling of fluctuation can be got.

They must be diagnosed from :—

1. Cellulitic deposits.
2. Encysted peritonitic effusions.
3. Broad ligament cysts.
4. Hydrosalpinx, Pyosalpinx.
5. Fallopian-tube gestation.
6. Fibroid and fibro-cystic tumours of uterus.
7. Hæmatoma, hæmatocele.
8. Solid ovarian tumours.

II. POSTERIOR TO THE UTERUS.

Physical Signs.—Bi-manually, the rounded elastic mass is felt, displacing the uterus to the front; if not incarcerated, the cyst may be pushed up.

They must be diagnosed from:—

1. Encysted peritonitic effusions.
2. Hæmatocele and hæmatoma.
3. Fibroid and fibro-cystic tumours of uterus.
4. Extra-uterine pregnancy.
5. Retroverted gravid uterus.
6. Broad ligament cysts.

(*b*) When the Tumour is Large, Pediculated, and Abdominal.

Physical Signs. — Distension of abdomen, often especially on one side, though it may be uniform. Superficial abdominal veins may be dilated; lineæ albicantes often present. Distance from anterior superior iliac spine to umbilicus usually greater on the side on which the tumour is situated. On palpation, the rounded tense mass is felt. Fluctuation generally distinctly obtained. Besides the main cyst, smaller ones may be felt. There are no variations in the consistence of the tumour wall.

On percussion in the dorsal position, there is dulness over the tumour and resonance in the flanks, unless there be ascites as well, or fæces in the colon; the percussion is the same when the patient is turned on her side, unless the tumour is very moveable. On auscultation no bruit is heard as over a fibroid or a pregnant uterus. If there be peritonitis over the tumour, friction may be heard. On vaginal examination the uterus is found displaced to one side or to the front, rarely to the back, and not necessarily enlarged.

The rounded mass can be felt bi-manually. It is impossible to push the outer hand down into the pelvis below the tumour. To find out the side from which the tumour is growing, grasp the cervix with a volsella, and pass a finger in the rectum; while an assistant pulls up the tumour from the outside, draw down the cervix, and with the rectal finger feel the tense pedicle; also, the unaffected ovary may be felt on its own side.

These large tumours must be diagnosed from :—

1. Pregnancy, hydramnios.
2. Fibroid and fibro-cystic tumours of the uterus.
3. Ascites, encysted peritoneal effusion.
4. Cysts of the broad ligament.
5. Thickened omentum adherent to intestines.
6. Omental tumours.
7. Renal and splenic tumours.
8. Hydatid of liver.
9. Pseudocyesis, tympanites.
10. Distended bladder.
11. Hæmatoma, hæmatocele.

III. WHEN THERE IS A TUMOUR ON EACH SIDE.

This condition can only be *accurately* diagnosed if the tumours are not larger than a man's head and not close together, or if there is much disproportion in their sizes. In large tumours, a groove felt between them cannot be distinguished from a sulcus between two parts of a single large cyst. If the cysts be not too large, independent movement of them may be obtained. Usually one is much smaller than the other.

IV. EXTRA-PERITONEAL CYSTS.

1. *Small.*—These give rise to no symptoms; they may be made out on bi-manual examination; the uterus may be pushed somewhat to the opposite side.

2. *Large.*—Usually there are no marked symptoms; owing to the extra-peritoneal extension of these tumours, uterus, bladder, or large intestine may be pushed aside. Thus the uterus is often raised high, or the tumour has a tympanitic note over it; the tumour may be felt low down beneath the pouch of Douglas.

Large parovarium cysts have thin flaccid walls, the fluctuation wave being easily obtained; they change their shape on change of position.

Adhesions.—These are caused by localised peritonitis. They often result from the tapping of cysts, as well as from torsion. They may sometimes be felt on pelvic or bi-manual examination. Patient may feel pain where they are situated; friction may be felt and heard. Abdominal wall may be fixed to the tumour. The tumour may also be adherent to the omentum, intestines, and pelvic organs, though the extent of the adhesions can never be made out by examination.

Torsion of the Pedicle.—In torsion, the pedicle twists either to the right or left; from half-a-turn to six turns have been found. The causes are not definitely known; the following are mentioned:—Growth of pregnant uterus; emptying of pregnant

uterus; sudden changes in abdominal pressure—*e.g.*, in lifting; movement during a physical examination; unequal growth of the tumour. Predisposing factors are a long pedicle and ascites. Dermoids are especially prone to torsion.

Results of Torsion.—Œdema of the pedicle and cyst-wall; hæmorrhage in cyst wall and cavities, very abundant in some cases; peritonitis, causing adhesions to adjacent structures; often gangrene of the cyst.

After a while thrombosis of the veins occurs, and pedicle gets brittle, and may become divided. Retrogressive changes may be set up in tumour—*e.g.*, fatty degeneration and calcification, and cause it to shrink, though it is rare to find a permanent shrinking. More usually a new blood-supply is set up through the adhesions.

The intestine may be occluded by the torsion. Torsion is a very serious complication. The patient may die from intra-cystic hæmorrhage, shock, acute peritonitis, gangrene of the tumour, suppuration, or pulmonary embolism.

Symptoms.—These depend upon the acuteness and extent of the attack. In a well-marked case there is severe pain in the abdomen, and shock; if the hæmorrhage be marked there is also pallor, faintness, giddiness, and rapidity of pulse.

If the patient survive the acute attack, she often suffers from ill-health, constant pain, ascites, and has a sallow cachectic look.

Rupture of Ovarian Cysts.—The causes of this are various. The wall may grow very thin in one or more places and burst; hæmorrhage may lead to it; thrombosis followed by fatty degeneration and gangrene; suppuration of cyst contents, sometimes; in papillomatous cysts the papillary excrescences may perforate the wall; blows, falls, or injury during labour may cause it. The results of rupture into the peritoneal cavity vary. In the least dangerous unilocular cysts, the clear serous fluid is absorbed; rarely is rupture of these dangerous.

The contents of colloid tumours, if not mixed with blood or pus, or the contents of a dermoid, may not cause peritonitis, but may remain unabsorbed for a considerable time. After rupture the tumour is smaller, and free fluid may be found in the abdomen. When papillomatous tumours rupture, metastatic tumours grow on the peritoneum.

Rupture may occur into the intestines, into the tubes, bladder, or through the abdominal wall.

Symptoms.—When innocuous fluids escape into the peritoneal cavity, no marked symptoms occur, and the occurrence may escape notice.

When dangerous fluids escape there is collapse, shock, and severe peritonitis, which may be fatal.

In many cases profuse diuresis and diaphoresis take place.

Co-existence of Pregnancy and Ovarian Tumours.—It must be remembered that any form of ovarian tumour on one or both sides may be found along with pregnancy.

Operations for the removal of Tubes and Ovaries, healthy and diseased, and also of Broad Ligament Cysts.

As all of these operations involve opening the abdomen, it is necessary to describe first of all the method of procedure in all cases of abdominal section, and afterwards the variations depending upon the nature of the case.

1. Preliminaries.—Except in emergency cases the patient should be kept under strict observation for some days before operation. She should be kept quiet, and her strength well sustained; her diet should be simple and nourishing; her bowels should be regularly opened; the state of the heart, kidneys, etc., should be carefully investigated. A dose of opening medicine should be given the evening before the operation, and on the morning of the operation the rectum should be emptied by an enema. No solid food is to be taken the night before the operation, and in the morning no food whatever is to be taken (provided of course that the operation is done in the forenoon). The patient should take a bath the evening before the operation.

The operating room should be light, warm, and airy, and should be thoroughly disinfected beforehand.

The instruments, sponges, and dressings, rendered thoroughly aseptic, are carefully arranged; the sponges, large and small, as well as the forceps, should be counted before the operation. The operator and all who in any way assist him, are to thoroughly wash and disinfect

their hands and fore-arms. The patient's abdomen should be carefully washed with turpentine and corrosive sublimate solution, the pubic hairs having been shaved; the umbilicus should be cleaned out with ether. The patient's bladder having been emptied, she is placed on the table in the dorsal position, her legs and chest warmly covered, hot water bottles being placed at her sides and feet. The arms are tied to the table, and the legs kept in position by a broad binder passed around the knees. Pieces of Macintosh are then placed over the patient, save where the abdomen is exposed, and on these are placed towels wrung out of a hot antiseptic solution.

The patient is anæsthetized.

2. The Operation. — The following are the stages :—

(1) *The abdominal incision.*

This is made in the middle line, starting one inch above the symphysis; the length varies according to the necessity of the case; usually it is about four inches. It passes through skin, fat, linea alba, extra-peritoneal fat and peritoneum; before cutting through the latter the operator and his assistant raise it with two pairs of forceps, the incision being carefully made between them. Bleeding points are caught before the peritoneum is opened. A finger is now passed into the abdomen, the viscera pushed aside and the peritoneum is cut with scissors to the full extent of the skin cut. The whole hand or two fingers now explore the pelvic cavity.

(2) *Removal Stage.*

(*a*) Uterine appendages (Tubes and Ovaries).

Where these are healthy, their removal is very simple. They are brought up into the wound, and a strong silk ligature carried through the broad ligament below the ovary by means of a pedicle needle; the needle is withdrawn, the ligature being left doubled in the ligament, the loop being on one side and the free ends on the other. The loop is pulled further through and passed over the tube and ovary; one of the free ends of the ligature is passed through the loop and then both ends are pulled upon, so that the tissues within the loop become firmly constricted. The two ends are then tied firmly (Staffordshire knot). With two pairs of Pean's forceps the tissues are grasped half-an-inch from the ligature on the distal side; the appendages are then cut off close to the forceps. The stump is then carefully sponged; if it does not bleed, the free ends of the ligature are cut away and then the forceps removed.

In the same manner may be removed inflamed ovaries and tubes, small ovarian tumours, tubes distended with pus or blood, and unruptured early tubal gestations.

When there are adhesions, they must be divided before the appendages can be raised high enough for the passage of a ligature; if they are recent and soft, the finger may easily divide them; if old and tough, it may be necessary to cut them, having previously ligatured them in two places. Where there is much trouble with adhesions, it is better to enlarge the

abdominal incision, drawing the bowels out and wrapping them in warm towels, so as to allow the light to be directed into the pelvic cavity with a hand mirror; in this way the operator can see what he is doing, and runs less risk of damaging important structures.

Sometimes it is impossible to free all the adhesions, and part of the appendages may require to be left behind.

Where the Staffordshire knot cannot easily be employed, it is better to use two or three separate ligatures which interlace.

When removing distended tubes, they should not be opened if possible; if, however, they are too large to allow of the easy application of ligatures, they may be carefully aspirated before being drawn up, care being taken that no fluid runs into the abdomen.

(*b*) Ovarian cysts.

When the cyst wall has been examined with the exploring hand, its contents must be removed. This may be done with simple puncture by means of a knife, the fluid being caught in a pan or with a large Wells' trocar. The fluid, if glairy or colloid, may not flow out, but may be required to be squeezed or scooped out. All through this stage an assistant keeps up steady pressure on each side of the belly.

When enough of the cyst contents has been removed the opening in the cyst wall should be closed with long forceps, and the cyst gradually drawn with Nelaton's or any strong forceps through the abdominal incision, the assistant keeping up all the time the lateral pressure.

The withdrawal of the cyst may be hindered by adhesions to various organs and viscera. They must be divided as they are met with. Soft or recent ones are best divided through rubbing them with a dry sponge; dense or firm ones should be ligatured and then cut through.

When the cyst is entirely outside the abdomen the pedicle remains to be secured. This may be done with the Staffordshire knot, or with two or three interlacing ligatures in the manner already described. The tumour is then cut away.

(*c*) Solid ovarian tumours.

These are removed in a manner similar to that described for the removal of the appendages.

(*d*) Cysts partially or entirely extra-peritoneal.

Here the tumour must be aspirated, its peritoneal covering incised so as to allow the tumour to be enucleated and gradually pulled out. There may be profuse bleeding, which must be checked with forceps and ligatures. When the tumour is removed the raw extra-peritoneal surface may be completely closed by means of sutures.

Care must be taken, in the enucleation, not to injure the ureter or rectum, and not to leave bits of the tumour behind.

(3) Peritoneal toilette.

The peritoneum must be made as dry and clean as possible. In cases where the parts are removed without anything getting into the peritoneal cavity, nothing requires to be done. In complicated cases, however,

where blood or other fluid has escaped, the abdomen should be thoroughly washed out with warm boiled water, and then thoroughly dried by means of sponges. When oozing of blood into the peritoneum is to be expected after the operation, the cavity should be drained for eight to twenty-four hours by means of a perforated glass tube which passes through the lower part of the abdominal incision into the pelvis.

(4) Closure of the wound.

This is done by a series of transverse ligatures (French Silk No. 8), half-an-inch from one another, passing from skin, right through the peritoneum; the bowels are protected from injury by the needles, and blood prevented from getting into the abdomen by means of a large flat sponge placed over the bowels behind the abdominal incision, before the ligatures are applied. After the deep sutures are in position, the sponge is removed and the sides of the abdominal wound approximated, the ligatures being drawn tight. (At this stage the sponges and instruments should be counted by the one in charge of them.) The ligatures are now tied. If the edges of the wound gape at all, they may be closed by superficial sutures of catgut or horse hair. The ligatures are then cut away about an inch from the skin.

When a drainage-tube is left in the wound all the ligatures are firmly tied save one next it, which is left intact after the others have been cut away beyond the knots; its ends are grasped by a pair of Pean's forceps and left on the abdomen to be tied up firmly after the removal of the tube.

(5) Dressing of the wound.

Wipe away all blood, dust with iodoform, and cover with antiseptic wool. The dressing is kept in position by means of an abdominal binder. If the case goes on well the dressing is not changed until the stitches are removed from the abdominal wall on the eighth day. If there is drainage it must be changed according to the amount of discharge.

(6) After-Treatment.—The patient is kept in a quiet room under the care of special day and night nurses. During the first twenty-four or thirty-six hours, no food is to be given by the mouth. If the patient be thirsty it is best simply to moisten the mouth, though some operators allow patients to sip hot water freely. If the patient has nausea her head should be lowered, a mustard application placed over the stomach, and as little fluid as possible taken into the stomach; cold black coffee is often best retained. For colic or flatus a rectal tube may be used; also, an enema of warm water or one containing some turpentine. If sickness persists for two or three days, calomel may be given or Epsom salts in order to get the bowels freely open. Some recommend morphine hypodermically for bad vomiting. After the sickness is past the patient may be given milk, potash water, beef-tea, chicken-tea, beef-jelly, and chicken-jelly.

Collapse must be treated by keeping the patient warm, lowering the head, giving brandy and beef-tea enemata, and ether or brandy hypodermically if necessary.

Secondary hæmorrhage may take place from adhesions or from the pedicle, and must be treated by the re-opening of the abdomen and the re-application of ligatures. Transfusion of blood may be necessary.

Elevation of temperature is to be checked by the application of ice-bags to the head and abdomen, by quinine, salicylate of sodium or antipyrin given with caution. It is very important first of all to make out the cause of the pyrexia.

Septicæmia due to septic peritonitis must be treated by giving the patient the most nourishing food and plenty of stimulants; the abdomen should be washed out with weak antiseptic lotion and drained.

On the eighth or ninth day the abdominal wound stitches are removed, the surface of the skin washed in antiseptic lotion and covered with a strip of antiseptic absorbent dressing, being kept in position by four or five strips of adhesive plaster applied to the abdomen transversely.

Should there be any suppuration in the stitch-tracks, the wound must be dressed daily; it may be necessary to enlarge some of the stitch-holes in order to allow free escape of pus.

AFFECTIONS OF THE UTERUS.

MALFORMATIONS.

1. Complete absence of the Uterus.

2. Rudimentary Uterus.—In this form the uterus is only a small band of connective tissue and musele on the posterior wall of the bladder.

3. Uterus Bipartitus.—In this form there is a rudimentary eervix with whieh are connected the two eornua, either solid or hollow.

4. Uterus Unicornis.—In this form only one eornu is developed; it slopes from the eervix upwards and to one side. The other eornu is either absent or rudimentary.

5. Uterus Diadelphys. — In this form the two halves of the uterus remain separate; the vagina may be absent, single or double.

6. Uterus Bicornis.—In this form the uterus is divided into its two eornua. There are many variations in shape, aecording to the amount of fusion, from a slight depression at the fundus to a well-marked division. The amount of external division may not agree with that of the internal.

7. Uterus Septus.—In this form the uterus has the normal outward form, but inwardly there is a mesial septum, varying in different cases, dividing the uterine cavity.

8. Infantile Uterus.—This uterus is small, being especially marked by the shortness of the body in relation to the cervix; the latter may be two or three times as long as the former.

9. Congenital Atrophy is the term applied to the uterus when the organ has the normal virgin proportions, but is as a whole atrophied.

The first seven of these are developmental faults, and occur during fœtal life. The others are caused by changes taking place after birth.

Symptoms.—There may be nothing abnormal in the external genitals or in the girl's build. When the uterus is rudimentary, the vagina is rarely normal. The important symptom is impairment of function, and hence, is not met with until puberty. When the uterus is absent or rudimentary, the only symptom may be absence of menstruation. If the ovaries and tubes be developed, and there be part of a horn, there may be internal menstruation, the blood accumulating in the horn and tube. In the case of uterus unicornis, the well-formed horn may perform all the functions of the normal uterus; if the malformed horn be not in free communication with the cervix, there will be accumulation of menstrual blood in it. Pregnancy may sometimes occur in the detached horn. In the case of uterus diadelphys there are no

symptoms unless the vagina be absent or closed. Uterus bicornis and uterus septus cause no symptoms, unless there is atresia of the cavity on one side; in such a case the menstrual blood accumulates. It must be remembered that while this is taking place, the other part may menstruate freely, so that the physician may, in investigating the case, be greatly puzzled.

In the case of the infantile uterus, and the congenitally atrophied uterus, there is absence or scantiness of menstruation.

When menstrual blood is accumulating inwardly, the patient complains at the beginning of puberty, of pains in the pelvis at each period; after a time the duration of the pain increases until often she complains of more or less continuous pain.

Diagnosis. — Absence of the uterus and rudimentary uterus can only be made out by the recto-abdominal bi-manual when the patient is anæsthetized.

In the uterus unicornis the well developed horn is felt sloping to one side, having only one ovary near it, the rudimentary horn and other ovary being at some distance from it. Uterus diadelphys is very rare. Bi-manually the division is felt; internally, sounds passed into the cavities do not touch. Uterus bicornis is recognised by careful bi-manual examination. Uterus septus cannot be recognised bi-manually, except when the vaginal finger feels the septum at the os; when the septum does not reach so far down, the condition may never be found out.

In cases where there are internal accumulations of blood, they may be felt on abdominal or bi-manual examination. The uterus infantilis and the uterus congenitally atrophied may be made out bi-manually; by the recto-abdominal examination or by the rectal alone, the uterus being pulled down with a volsella, these conditions may be diagnosed from one another.

Differential Diagnosis.—Pregnancy in a detached horn must be diagnosed from distension with blood, and from myoma uteri.

Treatment.—In the septate uterus, the septum can be divided. In the case of congenital atrophy, good feeding, iron and other tonics may do good. In other cases nothing can be done, save when menstrual blood is retained or pregnancy occurs in a horn; here, removal by abdominal section is necessary.

(Atresia of the cervix is considered along with atresia of the vagina.)

INFLAMMATION OF THE UTERUS.

I.—Mucous Membrane.

I. CERVICAL.

1. *Acute Inflammation.*—This only occurs along with an acute inflammation of the whole uterine mucosa, and will be considered under "acute endometritis."

2. *Chronic Inflammation.* — Known as chronic-cervical catarrh, cervical endometritis or endo-cervicitis.

Pathology.—The inflammatory changes affect the covering epithelium, the glands and the connective tissue. The epithelium lining the cervical canal becomes greatly folded and extends beyond the os externum in the form of smooth or granular bright red patches. The cervical glands increase in size and number, and they extend lower in the cervix than they normally do: their outlets may become obstructed, and, giving rise to retention cysts which project towards the vaginal surface — known as Nabothian follicles, they sometimes burst and then the lining wall tends



Fig. 32.—*Schroeder.)* Papillary Erosion.

to proliferate. When the glands are markedly affected the cervix may become changed into a mass of cysts. The connective tissue is always increased in amount, producing thickening of the cervix and sometimes elongation. Under the microscope two forms of red patches may be distinguished:—

(*a*) Papillary.
(*b*) Follicular.

In the former the folds and recesses are long and narrow; in the the other they are shorter and broader, the recesses being mainly formed by retention cysts which have burst.

In both forms the covering epithelium is a single layer of columnar cells, smaller than those lining the normal cervical mucosa. This single layer has a red

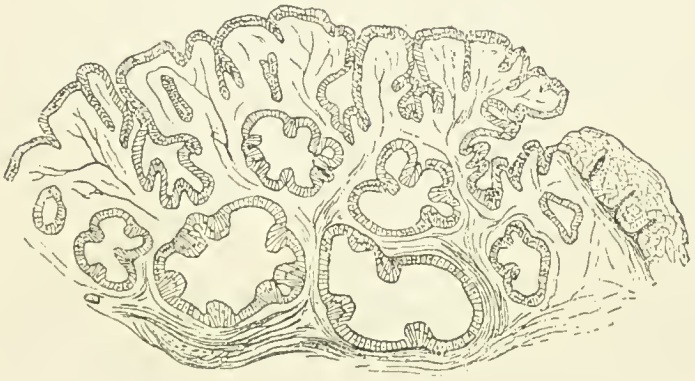


Fig. 33.—*(Schroeder.)* Follicular Erosion.

appearance owing to the underlying vascular tissue, and thus it stands out in striking contrast to the surrounding pale covering of the vaginal portion of the cervix. Formerly these red patches were described as ulcerative, from a wrong idea as to the pathology of the condition. Now they are known as "catarrhal patches," "erosion" or "ectropium."

True ulceration of the surface of the vaginal portion of the cervix does, however, sometimes occur.

Causes.—

(1) Laecerations of the cervix following labour.
(2) Spread of inflammation from endometrium or vagina.
(3) Retro-flexion of the uterus.

Symptoms. — Leucorrhœa; pains in the pelvis aggravated on exercise; irregular menstruation, often menorrhagia; stertility is favoured.

Physical Signs. — On vaginal examination the cervix is enlarged, the margin of the os is soft and velvety, and the os gapes in a multipara; one or more hard shot-like bodies are felt — Nabothian follicles. Sometimes one large follicle may be projecting as a polypus.

With a speculum, swelling of the cervix is seen, and, if the extension around the os has occurred, there is seen the bright red secreting surface of the catarrhal patch; the projections due to the Nabothian follicles are also seen.

Differential Diagnosis.—

(1) From vaginal leucorrhœa.
(2) From endometritis.
(3) From malignant disease.
(4) From simple laceration of the cervix.

In the last-mentioned condition through a speculum the os appears wide, and around it is seen a red velvety

surfaee ; this red surfaee is really the eervieal mueous membrane everted, and resembles a catarrhal patch. In the case of the laceration, however, if the edges of the tear be brought together the red patch disappears, whereas a true eatarrhal pateh eannot be made to disappear.

Treatment.—The general health must be seen to ; digestive system must be kept in good eondition ; sexual rest; daily douehing with a hot astringent douche (sulphate of eopper or alum, ℥ii. to a pint).

If the eondition does not subside apply iodised phenol two or three times. If the uterus be retroverted it must be replaeed.

In very bad or very ehronie eases, the diseased mueous membrane should be removed by Sehroeder's operation. If the cervix be much affected, *e.g.*, eystie, some of the tissue below the mueous membrane should be taken away also. (Martin's operation.)

In both of these, preliminary euretting of the whole eavity of the uterus is done ; the uterus is then drawn down by a volsella in eaeh lip, and divided on eaeh side as high as the fornix.

The posterior lip is then drawn downwards and baekwards and a transverse ineision made aeross the eervieal mueous membrane ; then from the lower end of the lip a eoronal ineision is earried up to the transverse ineision, and in this way the mueous membrane is removed. The lip is then doubled upon itself, so that the lowest point is brought to the mucous membrane still left, and is stitehed in this position by three or four eatgut sutures.

The same proeedure is earried out on the anterior lip. Finally, one or two stitches are applied on each side if there be any bleeding.

(Martin's operation is the same, only a thieker portion of tissue is removed.)

The operation is done in the lithotomy position under the constant irrigation of an antiseptic douehe, the vagina being exposed by a spatular speculum and retractors. After the operation an iodoform gauze plug is left in the vagina for thirty-six hours.

ENDOMETRITIS.

ACUTE. CHRONIC.

1. Acute Endometritis.—Both body and eervix are affected. Mucosa is swollen and covered with blood-stained mucus or pus; blood extravasations occur in it, and the vessels are deeply congested. The lining epithelium degenerates, and is cast off.

Causes.—The condition is rare, and does not occur before puberty. The causes are cold or excessive coitus at the menstrual periods; acute gonorrhœa; typhus; scarlet fever; measles; cholera; phorphorus poisoning; puerperal fever.

Symptoms. — Febrile symptoms, pains in the pelvis; in bad cases vesical and rectal tenesmus; discharge watery and clear at first, thick and purulent afterwards. When much peritonitis is present it causes the most prominent symptoms.

Physical Signs. — When peritonitis is present there is tenderness on pressure over the lower abdominal region. On vaginal examination, the cervix is swollen and congested; there may be catarrhal patches present; the discharge is seen oozing from the os.

Treatment.—Rest in bed; hot fomentations over abdomen; morphia internally; if the bowels are loaded they must be emptied.

2. Chronic Endometritis. — The inflammation affects the glands, the inter-glandular tissue or both together.

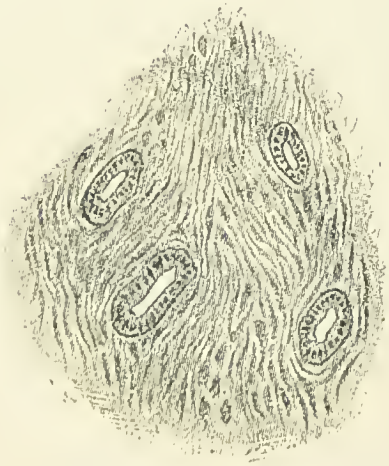


Fig. 34.—*(Schroeder.)*

Chronic Interstitial Endometritis.

In the glandular variety there is hypertrophy of the glands; new ones also are formed by ingrowths from the surface, or by outgrowths of old glands.

In the interstitial, there is a proliferation of connective tissue corpuscles, which become more spindle-shaped as the disease progresses; the fibres become larger and denser in chronic cases.

In another variety, called endometritis fungosa, the endometrium becomes swollen and spongy; there is dilatation of the glands, enlargement of the blood-vessels, and marked infiltration of the inter-glandular tissue.

In another variety, the villous or papillary form, the inflammation leads to the formation of granulation tissue, which projects into the cavity in the form of papillæ, the lining epithelium and glandular tissue of the mucosa being mostly destroyed.

In old standing endometritis, the mucosa gets atrophied and gradually destroyed, its place being taken by dense connective tissue; atresia of the cavity often results.

Causes.—

(1) Chronic endometritis may follow acute.
(2) After abortion; premature, or full-time labour, especially after incomplete emptying of the cavity.
(3) Cold at menstrual period.
(4) Tumours projecting into the uterine cavity.
(5) After the use of instruments with imperfect antiseptic precautions.
(6) Extension of inflammation from vagina and cervix.
(7) Retro-displacements of the uterus.

Symptoms.—Menorrhagia; in some cases metrorrhagia; leucorrhœa; weakness and pain in back and loins; abortion; sterility. Dysmenorrhœa is often present, but most probably is due to an accompanying metritis or displacement of the uterus.

In chronic cases the patient's system is run down, digestion is impaired, and she is often neurotic.

Physical Signs.—Uterus is enlarged. On passing the sound it may cause pain or bleeding; irregularities may, in some cases, be felt. In many cases the passage of the sound causes no discomfort.

Differential Diagnosis. — Hæmorrhagic form (E. fungosa) must be especially diagnosed from sarcoma or carcinoma of the body, and from incomplete abortion.

Treatment.—Hot douching; application of iodised phenol to endometrium; ergot by the mouth; careful attention to general health, diet, etc. If the case is not improved by these means, or if it be bad, curetting is of great value.

METRITIS.

I. Acute. II. Chronic.

1. **Acute Metritis.**—The uterus is enlarged, softened, and deeply congested. Microscopically, inflammatory products are seen infiltrating the tissues of the wall. The serous surface is usually inflamed also.

Causes. — Extension from acute endometritis or perimetritis. Mostly due to septic infection in the puerperium. It may result from cold during menstruation, gonorrhœa, and from excessive coitus. It may also follow the use of instruments from imperfect antiseptic precautions.

Symptoms.—When the cause is septic, the symptoms are those of septicæmia; locally, there is fulness, weight, pain, and great heat in the pelvis; vesical and rectal tenesmus. Menstruation is checked if cold causes the inflammation during a period; in other cases it is usually checked; only exceptionally is there menorrhagia.

Physical Signs.—Pain on palpation of lower abdominal region and on bi-manual. Vagina is hot and dry; uterus is enlarged.

Progress of the Disease.—The acute attack may pass off; it may become chronic; abscesses may form in the wall, and may burst into uterine cavity, bladder, bowel, or vagina. In other cases the patient may die from septic poisoning.

Treatment.—The patient is treated as in acute peritonitis. In septic cases it is necessary to give very nourishing food and stimulants.

If there be any local cause of septic infection, *e.g.*, decomposing membranes or placenta, the uterus should be curetted and douched out regularly with an antiseptic lotion.

2. Chronic Metritis.—Early the uterus is large, congested, and soft; later it becomes pale and hard; the enlargement is uniform. In the early stages, microscopically, are found between the muscle-bundles large numbers of leucocytes and connective tissue corpuscles; afterwards there is an increase in the size and density of the connective tissue fibres, the walls of vessels are thickened, and lymphatic spaces are enlarged.

Causes.—

1. Incomplete emptying of uterus after abortion, premature or full-time labour.
2. Tears in the uterus.
3. Puerperal pelvic inflammations.
4. Too early rising after delivery.
5. Non-lactation.
6. Frequent abortions, or two frequent child-bearing.
7. Uterine displacements.
8. Pressure of uterine or other tumours.
9. Endometritis.
10. Excessive coitus.

Symptoms.—There may be menorrhagia or metrorrhagia; leucorrhœa from the endometritis or endocervicitis present; tendency to abortion; in advanced stages sterility; often there is weakness in back and loins, and a feeling of heaviness and bearing down in the pelvis; reflex constitutional disturbances.

Physical Signs.—The uterus is equally enlarged and of a harder consistence than in the normal condition. The sound passes in beyond the $2\frac{1}{2}$ inch knob. There may be an associated displacement or pelvic inflammation.

After physical examination there may be doubt as to whether the enlargement of the uterus is—

1. Simple metritis.
2. Metritis with early pregnancy.
3. Early pregnancy.
4. Small fibroid.

Treatment. — Avoidence of heavy work for a time; regular easy exercise; rest for a couple of hours each day; hot douche daily; occasional hot hip-baths; cold morning hip-bath; attention to diet, and to the state of the bowels; coitus to be avoided for a time; ergot internally when there is menorrhagia. In obstinate cases, blistering of the iliac regions is most valuable. Curetting of the uterus is also good; amputation of one or both cervical lips stimulates involution, and is recommended by many.

Well-to-do patients are often improved by a course of treatment at foreign baths, *e.g.*, Kreuznach, Kissingen, Ems, and Vichy.

LACERATION OF THE CERVIX.

Pathology.—The most common seat of the laceration is the front and left side. (This must be associated with the most common mechanism of labour, viz., in

left-occipito-anterior cases, where the broadest part of the fœtal head lies to the front and left side.) The next most common form is a double laceration, one being in front and on the left side, the other being behind and on the right side: lacerations in other parts are much less common. The tear may be slight, or may pass up into the vaginal roof.

The following conditions may result from laceration of the cervix, viz.:—cervical catarrh, inflammatory thickening of the cervix, broad ligament or utero-sacral cellulitis, sub-involution of the uterus.

Causes.—About 32 per cent. of parous women have lacerations. They follow all kinds of labours, but perhaps especially occur after very tedious, very precipitate, or instrumental labours.

Symptoms.—Most probably *per se* laceration gives rise to no symptoms. It is the secondary lesions which cause these—*i.e.*, cellulitis, cervical catarrh, inflammation in the cervix, compression of nerves by cicatricial contraction. Hence we find the following conditions, viz., leucorrhœa, menorrhagia, metrorrhagia, pains in pelvis, reflex disturbances—*e.g.*, neuralgias, sweating, anuria, vomiting, etc., general weakness.

Diagnosis.—On vaginal examination the finger feels the tear. There is difficulty when the tear is very large, and the cervical mucous membrane everted. With a speculum the red cervical mucosa is seen; this can be made to disappear if the torn edges of the lips be brought together with a pair of volsellæ. In case

there be cervical catarrh as well, the red area may not be made to disappear. (*Vide* "Chronic Cervical Catarrh," page 89.)

Treatment. — Mere laceration requires no treatment unless there be symptoms due to secondary lesions.

As regards operative treatment, some advocate the immediate closure of the laceration after delivery; this is only to be done in very bad cases where the hæmorrhage is severe.

As to the operative treatment recommended by Emmet, in the case of an old tear, little need be said. It consists in paring the edges of the laceration, and uniting them with sutures.

This operation is rarely performed in this country. It is not necessary where the laceration is unaccompanied with secondary lesions, and in cases where these are present other treatment is sufficient. If hypertrophy of the cervix or cervical catarrh be so bad as to require operation, Martin's or Schroeder's operation is to be preferred.

RIGIDITY AND STENOSIS OF THE CERVIX.

Small Os Externum.—This may be congenital in origin: the cervix is conical in shape, very firm in consistence, and may be considerbly enlarged; cervical catarrh is often present.

Rigidity of the Cervix.—This condition is found especially after long-standing inflammation, whereby the connective tissue in the cervix is much increased in quantity.

Stenosis of the Cervix.—This condition may be congenital or acquired. The latter form is the more common, and may result from cicatrisation after labour, after amputation of the cervix, or after repeated burning with caustics; inflammation may also sometimes lead to it.

Symptoms.—Most prominent are dysmenorrhœa and sterility.

Diagnosis.—The condition of the cervix may be made out on bi-manual examination. There may be great difficulty in passing the sound in cases of stenosis; it must also be remembered that the sound may be obstructed by a flexion of the uterus, by a fold of mucous membrane, by a polypus, or by a reflex constriction of the sphincter around the os internum.

Treatment.—For stenosis the ordinary treatment is to enlarge the canal. This may be done by—

1. Dilatation.
2. Division.
3. Dilatation and Division.
4. Excision.

DILATATION.

Rapid dilatation is the best method. For this purpose Hegar's graduated dilators are valuable; any form of

dilator with expanding blades may also be used—*e.g.*, Ellinger's or Sims'.

The dilatation may be repeated two or three times, best shortly before menstruation. It is unsatisfactory as a curative measure since contraction of the canal is apt to follow it.

The operation is done under antiseptic precautions.

DIVISION.

The patient is chloroformed and placed in the lithotomy position. The vagina is thoroughly washed out, and the uterus drawn down with a volsella which is held by an assistant.

If the os externum only be stenosed, it may be divided with scissors. Some cut the anterior lip, some the posterior, while others make a cut on each side. The raw surfaces are then swabbed with a strong solution of perchloride of iron, and kept apart by a plug of iodoform gauze; the plug should be changed several times afterwards.

If the whole canal be stenosed a narrow bistoury may be passed up the canal and then drawn downwards cutting outwardly, the incision being deeper towards the os externum. This is done on both sides. The uterine cavity is then washed out, the raw surfaces swabbed with perchloride of iron, and the cervix firmly packed with iodoform gauze, which must be changed several times during the week following the operation.

DILATATION AND DIVISION.

It is best to combine dilatation with incision—*i.e.*, to make the former precede the latter, because the

cavity of the uterus can be thoroughly washed out before the cutting.

EXCISION.

In the cases in which there is much cervical catarrh or hypertrophy of the cervix, Martin's or Schroeder's operation is performed.

Atresia of the Cervix.—This condition is sometimes congenital. The occlusion is usually at the os externum; scarcely ever is the whole canal obliterated.

Acquired atresia is more common. The causes are the same as those of acquired stenosis. It also is found as one of the changes occurring in the uterus after the menopause.

(The treatment of Atresia of the Cervix is considered along with Atresia Vagina, page 169.)

HYPERTROPHY OF THE CERVIX.

A. — Hypertrophy of the Vaginal Portion.

Pathology.—The whole of this part of the cervix is affected, so that its length is increased, there being very little change in the transverse diameter. The hypertrophy may be so great that the cervix projects through the vulva.

Etiology.—The condition is most probably a congenital one. Inflammation in the cervix, as far as

is known, does not lead to this hypertrophy but to a transverse thickening.

Symptoms. — There may be dysmenorrhœa and sterility, as the cervical canal is sometimes very small.

When the hypertrophy is marked, there is bearing-down pain; leucorrhœa from irritation of the vaginal walls, and discomfort on walking. When the cervix projects beyond the vulva, it may become ulcerated.

Diagnosis.—Bi-manually, the fundus uteri is found at its normal height; the fornices are in their normal positions; the sound shows the uterine cavity to be elongated. By the recto-abdominal examination the part of the uterus above the vagina is found of normal size.

Treatment. — Amputation of the hypertrophied portion. There are two methods:—

1. Flap amputation.
2. Circular amputation.

FLAP AMPUTATION.

The amount to be removed is first of all decided upon. Then the cervix is cut on each side with scissors or bistoury, as high as is desirable, so that the anterior is divided from the posterior lip. Each lip is then amputated by two transverse incisions which meet above, thus allowing a wedge-shaped piece of tissue to be removed. The flaps are brought together by several catgut sutures, passed from the cervical mucosa to the vaginal surface of the cervix.

CIRCULAR AMPUTATION.

The cervix is drawn well down. With a bistoury a circular cut is made through the mucous membrane covering the vaginal portion of the cervix, a half-an-inch or so out from the os externum. With a knife handle the mucous membrane is stripped upwards above the incision, as far as it is thought necessary to go. The flap is kept up while the cervix is divided into an anterior and a posterior lip; the posterior is then cut at the level desired, the line of the incision being transverse, and passing from the cervical canal surface slightly upwards, so that the raw surface left is oblique. The posterior part of the free circular flap of mucous membrane is then turned upwards and stitched to the raw surface of the cervix by a series of sutures passed from the cervical mucous membrane through the circular flap. The same thing is done with the anterior lip. Finally, at the sides, if there is any gaping of the flaps they may be closed with catgut.

Both operations are done in the lithotomy position, with the usual antiseptic precautions. An iodoform gauze plug is kept in the vagina for twenty-four hours, and afterwards there is daily douching with an antiseptic lotion.

B.—Hypertrophy of the Supra-Vaginal Portion.

Pathology and Etiology. — Not clearly known. In most cases it is probably secondary to prolapsus uteri. It may be sometimes a primary condition.

Diagnosis.—It cannot be made out definitely by clinical means, because it cannot be made out in a case of hypertrophy where the os internum actually is; and, therefore, it is impossible to say whether the body may not take part in the hypertrophy. We do know, however, that in this form of hypertrophy both fornices tend to become obliterated as the hypertrophy increases.

In a well-marked case the bladder descends; in relation to the front of the hypertrophied cervix the pouch of Douglas becomes lowered also.

C.—Hypertrophy of the Intermediate Portion.

In this form the posterior fornix remains, while the anterior becomes obliterated. The bladder becomes much lower in position; the pouch of Douglas is unaltered.

Treatment.—In both these forms amputation of as much of the hypertrophied cervix as is possible, by means of the flap operation, is recommended. The altered relations of bladder and pouch of Douglas must be remembered in order that they be not opened into.

ATROPHY OF THE UTERUS.

This condition is met with:—

1. Congenitally.
2. Associated with certain constitutional conditions and wasting diseases — *e.g.*, chlorosis, scrofula, phthisis, etc.
3. After labour as a result of super-involution.
4. After the menopause.

SUPER-INVOLUTION.

Pathology.—The condition occurs after delivery, and consists in a diminution of the size of the uterus below the normal. It may be so small that the length is only $1\frac{3}{4}$ inch. The walls are thin and flaccid, sometimes very dense and fibrous. The ovaries are usually atrophied.

Etiology.—Over-lactation is the most common cause; great loss of blood in delivery may lead to it. Perhaps peritonitis leading to constriction and atrophy of the ovaries may be followed by super-involution.

Symptoms.—Amenorrhœa. There may be weakness and pain in the back, and sometimes reflex nervous disturbances.

Diagnosis.—Bi-manually, the uterus is felt small; sometimes it may be felt only with difficulty. The rectal and volsellar examination is valuable. The sound shows the cavity diminished; it must be used with care. The condition must be diagnosed from congenital malformation, congenital atrophy and senile atrophy.

Treatment. — The treatment is unsatisfactory. Good feeding; improvement of general health; iron, and other tonics.

DISPLACEMENTS OF THE UTERUS.

Varieties.—

1. *Flexion.*—Alteration in the relation of the body and cervix. There are three varieties—ante-flexion, retro-flexion, and lateri-flexion.

2. *Version.* — Rotation of the uterus round an imaginary transverse axis. There are three varieties —ante-version, retro-version, and lateri-version.

3. *Changes in the position of the uterus as a whole.* — The varieties are upward, downward, and backward, or lateral.

The following points must be remembered—

The uterus is a moveable organ, and is normally constantly in a state of movement; its movements are due to emptying and filling of bladder and rectum, and to changes in intra-abdominal pressure.

It is, therefore, necessary to distinguish between physiological and pathological displacements.

ANTE-FLEXION.

Pathology.—As to the frequency or importance of this condition there is much difference of opinion. What some consider pathological, others consider the normal anatomical curve of the uterus. Symptomatology does not clear up the difficulty of deciding this point, because there are no symptoms in many cases of extreme ante-flexion, and in others the symptoms may be caused by other existing complications — *e.g.*, endometritis, metritis, cellulitis, or peritonitis. Ante-flexion is more common in nulliparæ than in multiparæ. The point of flexion is usually at the level of the os internum. The angle of flexion varies greatly.

Etiology.—There are two classes of cases—viz., congenital and acquired. In the former, the whole uterus is small, the cavity narrowed, and the os externum of the pin-hole variety.

In the acquired kind, the cause seems to be in most cases utero-sacral cellulitis. Owing to the contraction of the thickened ligaments the junction of the cervix and body is drawn upwards and backwards, the fundus being driven forward; intra-abdominal pressure then tending to keep it more driven downwards and forwards.



Fig. 35.—*(Pozzi.)*
ANTE-FLEXION OF THE UTERUS, WITH CONTRACTION OF THE UTERO-SACRAL LIGAMENTS.

Peritonitic bands in the pouch of Douglas may sometimes cause the same effect.

Symptoms.—In many cases there are none. In other cases, especially those of *pathological* anteflexion, the symptoms are dysmenorrhœa, sterility, leucorrhœa, and sometimes menorrhagia. Dyspareunia is often present, as well as painful defæcation. Reflex nervous disturbances are often met with. Often there is frequency of micturition. The dysmenorrhœa may

be very severe; it is felt in the back, or in the whole pelvis, and lasts during the flow. There are several theories of the causation of the pain:—

1. The obstruction or mechanical theory, according to which the narrowness of the canal causes a hindrance to the menstrual flow, which coagulates in the uterus; and there are required strong contractions in the uterus to effect expulsion of the clots.

This theory is not proven. In many cases there are no clots, and often the pains are not like labour pains.

2. The congestion theory, according to which the pain is caused by the resistance of the tissues of the uterus to the hyperæmia, which takes place at the menstrual period, owing to the degree of flexion existing.

3. According to others it is not the flexion which obstructs the blood flow, but chronic metritis, so often found in cases of pathological ante-flexion. The uterus is denser and yields less easily.

Also, where cellulitis or peritonitis exists, there will also be an increase of pain, with increase of pelvic congestion.

Physical Signs.—By bi-manual examination, the cervix is felt looking downwards and forwards, the os in many cases being small. The fundus is felt through the anterior fornix, often very distinctly, and the flexion in the uterine wall may easily be made out.

If utero-sacral cellulitis or posterior peritonitis be present, the condition may be made out through the posterior fornix, or better, by the rectum.

The condition may be mistaken for—

1. Small myoma in the anterior uterine wall.
2. Cellulitis between the cervix and bladder.

In the former condition the passage of the sound with the bi-manual clears up the difficulty.

The latter condition is a very rare one.

Treatment. — Where there are no symptoms nothing is to be done. When inflammation is present, in or near the uterus, it must be treated as already pointed out (page 93). The general health must be seen to, as it is often run down. Locally, the treatment is not satisfactory. When there is no marked inflammation in the pelvis, dilatation or division of the cervix may be tried (page 183) for the relief of the dysmenorrhœa or sterility. Intra-uterine stem pessaries are recommended by some.

ANTE-VERSION.

Pathology. — It consists in a lessening of the normal ante-flexion in the uterus. The uterus is enlarged and firm. The cervix points more backwards than normally.

Etiology.—It results from changes in the uterus due to chronic metritis, for the causes of which see page 99.

Symptoms.—They are mainly due to the inflammation present. There may also be pressure on the bladder causing frequency of micturition.

Diagnosis.—On bi-manual examination, the uterus is felt enlarged and straightened. The os looks backwards into the hollow of the sacrum. The fundus is easily felt through the anterior fornix. The sound may only be passed with difficulty on account of the position of the os.

The only condition apt to be mistaken for ante-version is a cellulitis in front of and around the cervix.

Treatment.—That of Metritis, *q.v.* Sometimes a Hodge or ring pessary gives relief by supporting the enlarged uterus as a whole.

Special ante-version pessaries, so-called, are useless.

RETRO-VERSION.

(It must be remembered that a temporary retro-version is caused by distension of the bladder.)

Pathology. — Pathological retro-version is found under the following conditions—

1. It may be congenital.

2. It occurs in the puerperium; the weight of the uterus, along with the laxity of its ligaments, causing the displacement to occur when the patient is lying down.

3. It is found as a stage in prolapsus uteri.

4. It is a stage in the production of retro-flexion.

5. It may be caused by the contraction of peritonitic adhesions.

6. It may be caused by a great strain or sudden fall.

Symptoms.—*Vide* Retro-flexion.

Diagnosis.—On bi-manual examination, the cervix is felt low in the pelvis, the os looking downwards and forwards. The hands meet behind the symphysis, there being no uterine body felt through the anterior



Fig. 36.—*(Pozzi.)*

Retro-version of the Uterus, with Posterior Adhesions.

fornix. The body is felt through the posterior fornix. The condition can be more thoroughly made out by rectal examination. The differential diagnosis is the same as that of Retro-flexion, *q.v.*

Treatment.—*Vide* Retro-flexion.

RETRO-FLEXION.

Pathology. — The cervix is directed downwards and forwards. It is nearer the symphysis, and lower in the pelvis. Often there is marked cervical catarrh or thickening of the cervix.



Fig. 37.—*(Pozzi.)* Retro-flexion of the Uterus.

The fundus lies in the pouch of Douglas, the angle of flexion, varying in different cases, though in all cases the intra-abdominal pressure tends to drive the fundus to the bottom of the pouch. The uterus as a whole is larger, and there is usually endometritis. At the angle of flexion either wall may be thinned, though often neither is affected in this way. There is congestion of the organ.

The *ovaries* usually follow the displaced fundus, and often lie by its side; they may vary in position owing to peritonitic adhesions.

The *bladder* may be pressed upon at its neck; the ureters are often compressed, leading to dilatation in the upper portions, and this may tell back on the kidneys.

The *rectum* may be pressed upon.

The *utero-sacral* ligaments are stretched.

The *pelvic nerves* may be pressed upon, causing pain; or sometimes weakness in the lower limbs is caused.

Etiology.—It is more common than retro-version. It occurs chiefly in multiparæ. It especially follows the puerperium. If the patient rises too soon, works hard, or wears tight bandages, when the uterus is enlarged and the ligaments lax, a retro-flexion is very apt to be caused. It may follow a retro-version produced by other causes.

Symptoms.—Weakness or pain in the back or a bearing-down feeling; pain on defæcation; there may be frequency of micturition or trouble in making water; leucorrhœa, menorrhagia, dysmenorrhœa, sometimes abortion, sterility. Very often there are symptoms due to chronic pelvic peritonitis, which is present.

Diagnosis.—On vaginal examination the cervix is felt low, the os looking directly downwards. The body of the uterus is felt through the posterior fornix continuous with the cervix uteri, but separated from it by a groove. When the cervix is moved the body moves also. Bi-manually, the absence of the body through the anterior fornix is made out.

The following conditions may be mistaken for retro-flexion :—

1. Fæces in the rectum.
2. Deposit in the pouch of Douglas—due to peritonitis, hæmatocele, or cancer.
3. Cellulitis behind the uterus.
4. Myoma of the posterior wall of the uterus.
5. Prolapsed ovary or small ovarian tumour.
6. Tubal swelling prolapsed into pouch of Douglas.

Treatment.—

1. Treat any peritonitis or cellulitis that may be present.
2. Replace the uterus unless it be bound by adhesions.

The methods of replacing the uterus are :—

(1) By the recto-vaginal bi-manual.
(2) With the sound.
(3) By the genupectoral posture, together with recto-vaginal manipulation, and the use of the volsella to pull down the uterus, if necessary.

3. Retain the uterus in its replaced position.

This is done in most cases by means of the Hodge or Albert Smith pessary. The action of these is as follows :—the upper end gives a *point d'appui* to the posterior fornix, which, running over this end as a pulley, draws the cervix upwards and backwards, the fundus being kept forwards.

The pessary should be changed and cleansed every few weeks. After a time the uterus may keep its place

without the instrument. It may, however, require to be worn for years. If pregnancy occurs the pessary need not be worn after the fourth month.

Sometimes when the ovaries are prolapsed and tender, a Hodge or Albert Smith pessary may cause too much pain. Then, an ordinary ring-pessary may be introduced until the tenderness has subsided after douching, blistering, etc.

The following operations are recommended in some cases instead of the use of pessaries :—

1. Removal of the anterior lip of the cervix and an adjacent bit of vaginal wall ; in the healing process, it is said, cicatrisation causes the fundus to be pulled forward.

2. Alexander-Adams operation—pulling the round ligaments forwards, and stitching them to the abdominal ring so as to shorten them.

3. Stitching the fundus to the abdominal wall.

These methods are still on trial.

INVERSION OF THE UTERUS.

Pathology.—The uterus becomes inverted, its peritoneal surface forming a hollow depression. The fundus may extend down through the cervix into the vagina. The os externum may looscly embrace the projecting part or may constrict it firmly. The part in the vagina looks like a fibroid polypus in shape, but it is softer and of a deeper red, and bleeds easily when handled. The mucous membrane may become ulcerated, gangrenous, or hypertrophied ; it may get covered with thick stratified squamous epithelium.

The cervix is rarely displaced; sometimes it may be partly inverted.

The vagina may become inverted, if the uterus as a whole gets prolapsed.

The tubes and ovaries and intestines may at first lie within the inverted uterus but afterwards are drawn out. In old cases the opening into the depression becomes very contracted.

Adhesions very rarely form between the peritoneal edges of the depression. The bladder is unaltered in position unless there is prolapse of the whole uterus, in which case cystocele is produced.

Causes.—Inversion occurs under two conditions:—(1) In the puerperium. (2) With tumours — *e.g.*, sarcoma growing in the body of the uterus, at or near the fundus.

1. In the puerperium it may be produced in two ways:—

(1) By traction on the umbilical cord in order to pull the placenta from a uterus which is neither retracted nor contracted.

(2) By paralysis of the part of the wall to which the placenta was attached, this part becoming depressed towards the uterine cavity, the rest of the wall contracting around it. Intra-abdominal pressure will help to press the depressed portion still further down.

2. In cases of tumour growth, or malignant infiltration of the wall, inversion may take place through the weakening of that part of the uterus affected by the new growth.

Symptoms.—When the inversion occurs suddenly, there is a feeling of something giving way, pain, hæmorrhage, and often collapse; there is also retention of urine.

In chronic inversion the symptoms are hæmorrhage, bearing-down pain in the pelvis, weakness and anæmia.

Diagnosis. — By the vagina examination, a mass is felt, which is either rounded or moulded by the vaginal walls; above, the cervix can be felt surrounding it. The finger may sometimes be passed up the cervix for a distance, but in other cases owing to its contraction, or to the presence of adhesions in the canal, this may be impossible.

Bi-manually, the rim of the depression caused by the inversion is made out. By the rectum this also can be made out.

The condition must be distinguished from:—

1. Intra-uterine polypus.
2. Intra-uterine polypus extending into vagina.
3. Intra-uterine polypus with inversion.
4. Prolapsus uteri.
5. Inversion with prolapsus uteri.

Results.—Spontaneous cure may take place. In most cases anæmia, hæmorrhage, septicæmia, or peritonitis supervenes. In a few cases the patient seems to get accustomed to the condition and to get along very well with it.

Treatment.—

I. REPOSITION.

1. *Rapid Method.*—The patient's bladder and rectum must be emptied. Chloroform must be given.

For a few days before the operation it is well to dilate the vagina with a large Barnes' bag, so as to make room.

The uterus may be replaced by manual manipulation, being gradually pushed up; or White's repositor may be used to aid the hand. If necessary, the cervix may be incised to lessen its resistance.

2. *Slow Method.*— By continuous elastic pressure. Hydrostatic pressure in a rubber bag placed in the vagina has been used; also, a cup on a stem with elastic bands, which are fixed to an abdominal belt. The pressure must act in the line of the axis of the inverted uterus, and there must be counter pressure over the hypogastrium.

The pressure is kept up for one to three weeks.

In inversion due to tumour growth, the tumour must first be removed, if it be benign; if of a malignant nature, the question of removing the whole uterus must be considered.

II. AMPUTATION.

After all means at reposition have failed, amputation may be performed.

MYOMA UTERI.

Fibroid Tumours. Fibro-Myoma.

They are in most cases connected with the body, and are more common in the posterior than in the anterior wall. Only occasionally do they grow in the cervix.

Nature.—They are composed of non-striped muscle and fibrous tissue; the proportions of these vary in different cases. When the muscle is in great excess the tumour is of a soft consistence, flesh-coloured, passing gradually into the uterine wall, and usually single; this form is not common.

The ordinary fibro-myoma is firm, pale in colour, and surrounded by loose connective tissue which, with the surrounding muscular wall, forms the capsule of the tumour; the tumour may be free from the surrounding uterine wall, or may be connected with it at one part.

The capsule is usually richly vascular; few vessels pass into the tumour. On section the tumour has a glistening surface and presents the so-called "cotton-ball" appearance, the muscle being arranged in many centres, surrounded with the fibrous tissue. Though the tumour proper contains nerves, it is not sensitive. This form of tumour is very often multiple.

Fibroids grow slowly; the more muscular tissue the more rapid the growth.

During pregnancy they increase at a more rapid rate; after delivery they often become smaller, and may sometimes disappear. After the menopause, which is usually later in fibroids, their growth stops and they may shrink considerably.

The following changes occur in fibroids:—

1. Softening, due to œdema, fatty degeneration, or to myxomatous change.

2. Induration, due to gradual disappearance of the muscular tissue, and to contraction and hardening of the fibrous tissue. This is the usual post-menopausal change.

3. Calcification owing to the deposition of limesalts in the tumour. The deposit usually begins in the centre, sometimes in the outer layers. A calcified fibroid is often called a "womb-stone."

4. Suppuration may take place in sub-mucous fibroids from operative interference, and from constriction of its neck while it is being naturally expelled. In sub-peritoneal fibroids it may result from torsion of the pedicle or along with calcification.

5. Sarcomatous degeneration is sometimes found.

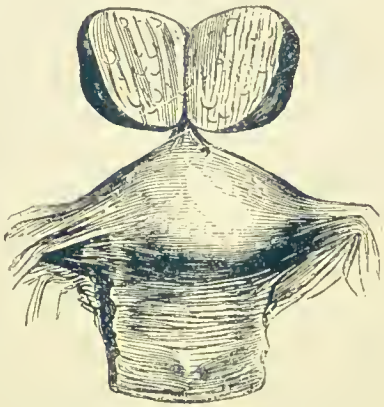


Fig. 38.—*(Pozzi.)*

Sub-Peritoneal Myoma cut open.

In the beginning all are interstitial.

Varieties.—Sub-peritoneal, interstitial, sub-mucous.

I. IN THE BODY.

1. *Sub-peritoneal.*—These grow into the peritoneal cavity. The pedicle varies in thickness; mobility of the tumour depends on size of pedicle.

The tumour may grow upwards and reach a large size, in which case it draws the uterus up, and causes it to be lengthened. It may lie in the pelvis from the first, or fall there on account of possessing a long pedicle, and may produce pressure symptoms, even becoming incarcerated.

Torsion of the pedicle may occur in some cases. As a result œdema occurs. Adhesions form between the tumour and neighbouring structures, and these may give a new blood-supply to the tumour which may be sufficient for its growth after the pedicle has given way, as it sometimes does after torsion. Suppuration, or gangrene, and fatal peritonitis may result.



Fig. 39.—*(Pozzi.)*

Interstitial Myoma at Fundus, cut into in several places.

2. *Interstitial.*—These remain in the uterine wall, and do not become pediculated; there may be as many as forty or fifty present.

3. *Sub-mucous.*—These are very important practically. They project into the uterine cavity, the pedicle

varying in size. It is covered by a capsule. Uterine contractions tend to make them more and more polypoidal, so that they may hang in the vagina. The capsule in some cases may rupture, the tumour being expelled—spontaneous enucleation.



Fig. 40.—*(Pozzi.)*

Sub-Mucous Myoma projecting into the Vagina as a Polypus.

Changes in the Uterus.—Its position is altered. It may be drawn upwards by a large sub-peritoneal tumour, and is sometimes twisted on itself. In other cases it may be forced down and prolapsed. It may be pushed to one side. It may be inverted by a sub-mucous fibroid.

Its size is enlarged, the wall becoming hypertrophied, especially in sub-mucous or interstitial fibroids. In the sub-mucous form especially the mucous membrane is also hypertrophied.

II. IN THE CERVIX.

Here they rarely occur. They may grow outwards towards the peritoneum, or downwards into the para-vaginal tissue, or into the vagina. The first two varieties may become incarcerated. The last may be mistaken for inversion or prolapse of the uterus.

Etiology.—Some say they are due to degenerated blood-vessels, others to parasitic irritation. They are related to the period of sexual activity. It is believed that they do not arise before puberty or after the menopause. The majority of patients seek advice between thirty and forty.

Symptoms.—Hæmorrhage is a marked symptom. It occurs as menorrhagia and as metrorrhagia. The blood comes from the hypertrophied mucous membrane of the uterus; when the fibroid projects as a sub-mucous polypus, and the pedicle gets constricted, there may be bleeding also from the congested mucous membrane covering the tumour. Ulceration of the mucous membrane over the tumour, or rupture of veins in the capsule may also give rise to hæmorrhage; in the latter case it may be sudden and sometimes fatal.

In sub-peritoneal fibroids there is no menorrhagia or irregular bleedings.

Dysmenorrhœa is common. When there is a sub-mucous polypus it gets congested at the menstrual period, and the contractions of the uterus occur in the effort to expel it; these pains are like labour pains. In the case of interstitial and sub-peritoneal tumours of some size, the pain is of a dragging nature.

With large tumours there may be a feeling of weight or bearing-down. When a tumour is incarcerated in the pelvis the pain at the menstrual period is very intense. Pain may of course be due, in some cases, to peritonitis over the tumour or to torsion of the pedicle. There may be pains in the legs or neuralgic pains in other parts of the body.

Pressure symptoms are important. The bladder may be pressed on, causing frequency of micturition; or the urethra, causing difficulty of micturition or retention; this may occur in some cases at each menstruation. A small fibroid pressing on the bladder may produce symptoms like those of cystitis in some cases.

Pressure on the rectum may cause constipation or obstruction, sometimes diarrhœa.

Pressure on the veins causes hæmorrhoids and varicosity in the legs. Pressure on the ureters leading to hydronephrosis only rarely occurs.

Sterility is common. If pregnancy occurs, abortion is apt to follow; if the case go on to full time, the labour may be very troublesome and dangerous.

Course of the Disease.—Sometimes, it is said, fibroids disappear. Such cases are probably chiefly met with in the puerperium. A few may occur at the menopause.

At the menopause a diminution in size only is the usual change.

Expulsion of the tumour may take place, by its pediculation and extrusion as a polypus, by enucleation from its capsule, or by suppuration and breaking down of the tumour.

Death may result from acute peritonitis with or without torsion, from loss of blood, from uræmia due to pressure on the ureters, and from suppuration in the tumour.

Physical Diagnosis.—

I.—SMALL FIBROID TUMOURS.

(1) Pediculated sub-mucous fibroids are easily made out by passing the finger through the os. When they are large and project into the vagina they may be mistaken for inversion of the uterus.

(2) Small interstitial fibroids low down may lead to difficulty in diagnosis, when they bulge one lip of the cervix markedly. They are apt to be mistaken for inversion.

(3) Small interstitial fibroids high up or sub-peritoneal ones with a broad pedicle may be easily missed. The bi-manual with the sound helps to make out the condition.

The conditions from which small fibroids — sub-mucous or interstitial, require to be diagnosed are :—

Inversion of the uterus.
Chronic metritis.
Early pregnancy.
Ante- and retro-flexion.

Those from which small sub-peritoneal fibroids must be diagnosed are :—

Swellings of ovary.
Swellings of Fallopian tube.
Swellings in the broad ligament.

II.—LARGE TUMOURS.

The tumour can be well defined, and has a firm consistence in most cases. Soft fibroids may give a deceptive feeling as of a cystic mass.

The tumour is in intimate union with the uterus. Sub-peritoneal fibroids have a range of movement depending on their size, the length of the pedicle, and the number of adhesions.

On percussion the note is dull unless there are intestines in front of the tumour. A uterine souffle is heard, especially at the sides; it is not heard in the case of sub-peritoneal tumours with a small pedicle.

On vaginal examination the uterus may be lifted high up, or may be in various other positions. On bi-manual the uterus and tumour appear as one mass, save in some cases of sub-peritoneal tumours with well-marked pedicles. The passage of the sound shows that the uterine cavity is enlarged; the passage may be difficult or impossible.

Large fibroids must be diagnosed from :—

(1) Advanced pregnancy.
(2) Ovarian and parovarian tumours.
(3) Extra uterine pregnancy.
(4) Blood effusions.
(5) Inflammatory deposits.

Treatment.—

I.—MEDICAL.

Where the tumour is growing rapidly a low non-stimulating diet is valuable. Give ergot or *hydrastis*

Canadensis internally. When there is discomfort or any tendency to hæmorrhage, the patient should give up heavy work and rest awhile each day, taking special care at each menstrual period. The support of the uterus by a Hodge pessary when bearing-down is complained of, often gives relief; likewise, a binder is good to wear where the fibroid is very large.

When a tumour tends to fill the pelvis, it should be pushed above the brim so as not to become incarcerated.

II.—ELECTRICAL.

This treatment does not cause disappearance of the tumours; it only relieves symptoms.

Galvanic electricity is employed. One pole is attached to a large plate placed on the abdomen, the other is introduced by means of a sound into the cavity of the uterus, or in the case of projecting polypi into the tumour-mass. In all cases antiseptic precautions are used.

The internal electrode is usually negative, save when the fibroid bleeds much; in that case the positive is introduced because of its strong hæmostatic action. The applications are made every few days, the strength of current in different cases varying from 70 to 250 milliampères.

III.—SURGICAL.

1. **Removal by the Vagina.**—By this method, sub-mucous polypi are removed. The difficulty of the operation depends on the size of the tumour. Strict antiseptic precautions must be used. Small tumours may be twisted off by forceps.

Larger ones may be removed by means of the chain or wire ecraseur, or, if the pedicle is easily reached, it may be ligatured and the tumour removed. Very large tumours may be removed piecemeal by means of the ecraseur, by means of a spiral incision with a bistoury, whereby the tumour is gradually drawn down or, best of all, by cutting through the capsule of the tumour, shelling out the latter, and then ligaturing the capsule as high as possible.

In cases where the cervix is not sufficiently dilated, it may be dilated or incised. Sometimes, in nulliparæ it may be necessary to stretch the vulva and incise the perineum in order to get room.

2. Operations through the Abdominal Walls.—

1. Removal of the appendages. This brings on the menopause, checking the growth of the tumour and the hæmorrhage, and causing an improvement in the patient's condition in most cases.

2. Removal of the tumour.

(1) Subserous pediculated.—Here the pedicle is transfixed and ligatured, and the tumour removed.

(2) Tumours growing into the broad ligament.—These require to be enucleated, the resulting cavity is closed by means of sutures.

(3) Interstitial tumour.

(*a*) Enucleation may be performed, and the cavity closed by continuous suture.

(*b*) Removal of the tumour along with part or whole of the uterus—hysterectomy. After the abdomen is opened the broad ligaments are ligatured from above downwards and inwards, as far as the level of the cervix, where the amputation is to be made; the uterus is then separated from the ligaments. A temporary elastic ligature is then placed around the cervix, and the uterus with the tumour removed, the stump being left in a V-shape; the latter is then carefully ligatured, the peritoneal edges being carefully approximated; others prefer to treat the stump extra-peritoneally. It is carried through the abdominal incision, and may be kept in position by Tait's or Keith's clamp or the *Serre-nœud;* or it may be merely ligatured and stitched carefully to the edges of the wound.

Résumé of Treatment.—

1. Sub-mucous polypoidal fibroids should be removed.

2. Sub-peritoneal fibroids, causing no symptoms, are to be left alone.

3. Rapidly growing or hæmorrhagic tumours should be treated by operation, if the patient be not near the menopause.

(1) The appendages may be removed.
(2) The tumour may be removed.

FIBRO-CYSTIC TUMOUR OF THE UTERUS.

Pathology.—These are fibroids in which collections of fluid have occurred. The cavities may be dilated lymphatics, or caused by mucoid or sarcomatous degeneration.

Symptoms.—Like those of fibroids. As most are sub-peritoneal, menorrhagia is not common.

Diagnosis. — *Vide* Fibroids. They may be mistaken for ovarian tumours, or for very soft fibroids.

Treatment.—Removal by laparotomy.

INTRA-UTERINE POLYPI.

Varieties.—

(1) Sub-mucous fibroids.
(2) Mucous polypi, or simple adenomata.
(3) Pediculated Nabothian follicles.
(4) Placental and fibrinous polypi.
(5) Cervical papilloma.

I.—SUB-MUCOUS FIBROIDS.

These have been described under Fibroids.

II.—MUCOUS POLYPI.

These develop mostly from the cervical mucosa. They are soft and vary from the size of a pea to that of

an almond; they are cherry-red, being very vascular. There are usually more than one. Microscopically, they are seen to consist of spaces lined with columnar or cubical epithelium lying in a connective tissue stroma. The same epithelium covers the surface, save in cases where it occurs near the os externum, when the covering may be more or less stratified squamous epithelium.

III.—PEDICULATED NABOTHIAN FOLLICLES.

These have been described under chronic cervical catarrh.

IV.—PLACENTAL POLYPI.

These occur after incomplete removal of the placenta in delivery. On the remains of the placenta, blood is poured forth and fibrin is formed; a mass may be formed as large as an egg.

After an abortion the same thing may occur with decidua left behind.

There may be a good deal of hæmorrhage, and a foul discharge from these.

V.—CERVICAL PAPILLOMA.

A rare condition. It is of a cauliflower shape. It may be simple, but most are malignant.

Symptoms. — Menorrhagia, metrorrhagia, dysmenorrhœa, leucorrhœa, discomfort, sterility.

The bleeding in the case of the fibroid polypus comes from the hypertrophied uterine mucosa or rarely from rupture of veins in the tumour-capsule; in the

case of the mucous polypus it comes from the tumour itself. The bleeding may be very bad; the patient may have a cachectic look which may lead to the suspicion of malignancy.

The dysmenorrhœa is due to the efforts of the uterus to expel the polypus, and is only marked with a polypus of some size.

Occasionally morning sickness, pigmentation of the breasts and abdomen may be present with polypi.

Diagnosis.—

I.—WHEN THE OS EXTERNUM IS DILATED.

The cavity may be explored with the finger. If the tumour be firm or larger than a large almond, and the uterine cavity be enlarged, the tumour is a fibroid; if it be small, soft, and bleeds easily, or if there be more than one small polypus, the tumour is mucous. In the latter case the uterus is not necessarily enlarged.

On bi-manual the uterus is found enlarged with fibroids, and not enlarged with mucous polypi, unless metritis be present.

By specular examination the mucous polypus is a bright cherry red. The fibroid is not so red, and may be very pale if the capsule be ruptured; if the surface be ulcerated or sloughing, it appears different.

II.—WHEN THE OS EXTERNUM IS NOT DILATED.

Here the bi-manual and sound may help. If the uterus be clearly enlarged there may be a fibroid polypus. Dilatation and examination with the finger is sometimes necessary.

If the uterus be not much enlarged, the diagnosis is more difficult; it is not likely, however, to be a fibroid polypus. Mucous polypi are not easily detected with the sound. Dilatation and digital examination may be necessary, or the curette may be used.

The following conditions may be mistaken for polypi.—

1. Inversion of the uterus.
2. Inversion and fibroid polypus.
3. Malignant disease of body or cervix.

Treatment.—

All polypi should be removed. For the removal of fibroid forms, *vide* page 131. Small mucous and other polypi may be twisted off with forceps, or removed with the curette.

CARCINOMA UTERI.

About 98 per cent. of cases occur in the cervix 2 per cent. in the body.

CANCER OF THE CERVIX.

Pathology. — There are three varieties — viz., encephaloid or medullary, schirrous, epitheliomatous. The first two affect especially the columnar epithelium lining the cervical canal and its glands; the latter arises from the squamous epithelium covering the vaginal portion of the cervix.

Carcinoma may begin in the substance of the cervix as a hard nodule, afterwards working to the surface and increasing in size. It may commence in the canal and spread in the mucous membrane. It may start in the vaginal portion of the cervix as a papillomatous tumour, or as an ulcerating surface.

In the early stages these forms may be distinguished; later, they cannot be. The cancer spreads in the following direction—viz., upwards into the uterus, downwards into the vagina, outwards into the connective tissue. The spread occurs both by lymphatic distribution, and by direct tissue invasion.

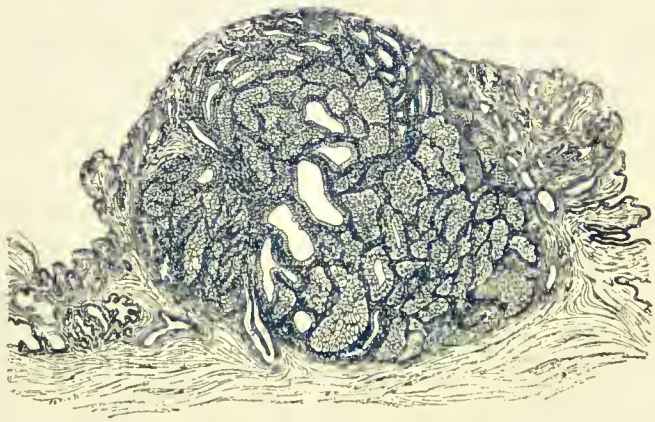


Fig. 41.—*(Wyder.)*
CANCEROUS NODULE IN THE CERVIX.

Cancer of the vaginal portion tends to affect the fornices and adjacent connective tissue and not to extend upwards. Cancer of the rest of the cervix tends to affect the neighbouring connective tissue and also to spread up into the uterus.

Along with cancer, the mucous membrane of the uterus is often found to be in a state of hyperplastic endometritis.

As the cancer grows it may extend to neighbouring structures. It may affect the bladder wall, setting up first vesical catarrh, then sloughing, and finally perforation of the wall. The ureters are often involved by pressure, or by direct infiltration of their walls; thus, dilatation of their upper parts, hydronephrosis and atrophy of the kidney may result.



Fig. 42.—*(Pozzi.)*

CANCER OF CERVIX—PAPILLOMATOUS VARIETY—SPREADING TO VAGINA.

The cancer may cause a perforation into the rectum, or into both bladder and rectum. The peritoneum is rarely opened into, because, as the disease advances towards it, peritonitis is set up, thickening it.

Etiology.—It seems to be more frequent in this country than it was in former years. It is more common in whites than in blacks. It seems in a

considerable number of cases to run in families. It does not occur before puberty. Below twenty years of age it very rarely occurs; it mostly occurs from forty-five to fifty-five, and then from fifty-five to sixty-five. It is more common among the poor than among the rich.

Local predisposing causes are erosion of the cervix, laceration of the cervix, and frequent child-bearing.

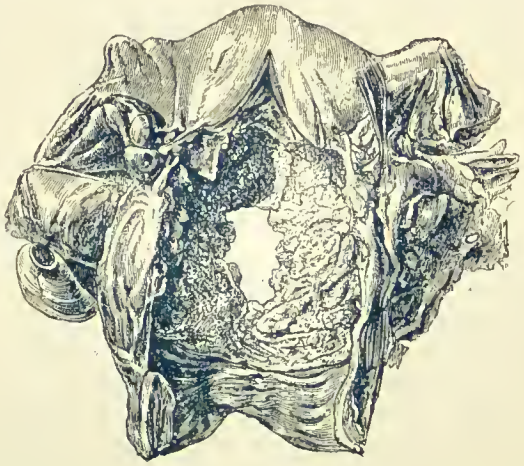


Fig. 43.—*(Pozzi.)*

Cancer of Cervix, with Perforation of Bladder.

Symptoms.—

1. Local.—In the early stage there are usually no symptoms; occasionally, pain may be met with early when there is early infiltration of connective tissue or of the uterus. After a time, however, well-marked symptoms are generally present. *Hæmorrhage* is often first noticed. It may be as menorrhagia or as

metrorrhagia. The patient may notice the leucorrhœal discharge more or less tinged, or she may notice a sudden sharp hæmorrhage. It may come on at defæcation after straining at stool or at coitus.

As these symptoms often occur in women near the menopause, they very generally neglect to seek advice, thinking that the cause is the common one; hence, in cancerous cases, this neglect may be a very serious matter.

In the very late stages hæmorrhage is not a marked symptom, unless a large vessel should be ulcerated through.

A bad-smelling discharge is a very prominent feature whenever breaking-down and ulceration of tissue occurs. (In the cauliflower epithelioma before breaking-down has begun, there may be excessive clear serous discharge.) The discharge is composed of serum, broken-down tissue, pus-cells, fatty degenerated cells, etc., with often more or less blood.

The colour varies greatly — white, yellow, gray, green, reddish-brown, blood-stained.

Pain is often present, though in some cases it is scarcely even noticed during the whole course of the disease. In the very earliest stage it is not noticed, but when the body of the uterus, or the cellular tissue is infiltrated, it is felt. It varies in character; it may be dull or sharp, and may shoot down the thighs. Where there is much breaking-down of tissue there is less tendency to pain. It must be remembered that pain may be in some cases due to localised peritonitis. Sympathetic pains in the mammæ and other parts occur in some cases.

2. General.—There is loss of flesh and debility as the disease advances. In the early stage the patient may look perfectly healthy. The weakness and pain usually lead to the so-called "Cancerous appearance." There is loss of appetite and digestive disturbance. There is difficulty or pain on micturition and defæcation when bladder and rectum are affected; when these structures are opened into, their contents pass by the vagina.

In advanced stages the patient has a well-marked odour, unless the discharge be thoroughly disinfected. Itchiness and redness of the outer genitals may be caused if the discharge is allowed to run over them.

The skin, in advanced stages, gets a yellowish tinge.

Diagnosis.—In the very early stages this may be a very difficult matter. A hardness may be felt in the cervix, the ulcerative form, or the cauliflower form on the vaginal surface, or the variety commencing in the mucosa lining the canal, might be recognised by the finger. In most cases the patients are not seen until the disease has progressed, when the diagnosis is easy. The hardness of the newly-formed infiltrating cancer is a very important sign. In most cases the examination causes a little bleeding. In doubtful cases small bits may be removed and examined.

The rectal examination is very important in all cases, in order to determine the spread of the disease.

Cancer of the cervix must be diagnosed from :—

1. Hypertrophy of the cervix.
2. Endocervicitis with Nabothian follicles.

3. Syphilitic ulceration, and condyloma on the cervix.
4. Cervical polypus.
5. Sloughing polypus.
6. Retained bit of placenta or membrane.
7. Sarcoma of cervix, fibroid of cervix.
8. Diphtheritic patch.
9. Lupoid ulceration.

Causes of Death.—Weakening of the system, uræmia, peritonitis, septicæmia, hæmorrhage, venous thrombosis.

Treatment.—The only cure is to remove the entire cancer. This, of course, can only be done in the early stage. There are two methods of carrying this out :—

1. High amputation of the cervix.
2. Total extirpation of the uterus by the vagina.

There is a dispute as to the relative values of these operations. Both have been used with good results.

I. HIGH AMPUTATION OF THE CERVIX.

This should only be done where the cancer grows from the vaginal surface of the cervix. The operation has already been described (page 107).

II. TOTAL EXTIRPATION OF THE UTERUS BY THE VAGINA.

The patient is placed in the lithotomy position, and all the usual antiseptic precautions are observed. The uterus is drawn downwards and forwards, and

the pouch of Douglas opened into by a transverse incision; bleeding from the raw edges is checked by catgut ligatures passing transversely from peritoneal to vaginal surface.

Next draw the cervix downwards and backwards, and open by a transverse incision into the utero-vesical pouch. Then with a curved needle pass a series of ligatures through the broad ligaments on each side of the uterus, taking care not to go out far enough to injure the ureters; each is tied after it is passed. With scissors the uterus is gradually cut away from the ligaments.

The stumps of the ligaments are then drawn down into the opening into the vagina. If the opening be too large it can be made smaller with a catgut suture. The wound is dressed with iodoform and an iodoform gauze plug is placed in the vagina. If the disease has spread too far for removal the only treatment left is of a palliative nature.

LOCAL PALLIATIVE TREATMENT.

Many believe in removing as much of the disease as possible whereby temporary improvement may be gained. There are various methods:—

(1) Applications of strong caustics — *e.g.*, nitric acid, zinc chloride, etc.

(2) Scraping out of diseased tissue.

(3) Amputation of the cervix.

(4) Either of the latter two methods, combined with the after application of a strong caustic.

Hæmorrhage is to be checked by the use of ergot. A hot douche or a very cold one may have to be used sometimes. In profuse bleeding it may be necessary for the physician to plug the vagina, or to apply styptics or caustics.

The bad-smelling discharge must be kept inoffensive by douches of carbolic acid, acetate of lead, etc. The external genitals must be protected with vaseline or olive-oil and glycerine.

Pain must be relieved by morphia, given by the rectum or hypodermically.

General Treatment. — Good feeding, good air, cheerful surroundings, freedom from worries, etc., are the points to be attended to. Sexual intercourse is not to be allowed.

II.—CANCER OF THE BODY.

Pathology. — Cancer may begin in the mucous membrane as a swelling, which may break down, or as a mass which projects like a polypus into the cavity; it may begin in the wall as a nodule which extends inwards or outwards. Adhesions may form between the uterus and neighbouring parts, and secondary nodules may grow in the peritoneum.

Etiology.—Same as in case of cancer of cervix. The affection of the body occurs later in life than cervical cancer, and is most frequent in nulliparous women.

Symptoms. — The same as in cancer of the cervix. Pain is, however, a *very early* symptom here. Hæmorrhage also occurs early.

Diagnosis.—Uterus is enlarged and moveable, or fixed by adhesions. The condition of the cavity of the body can only be made out by dilating the cervix and exploring with the finger. Diagnosis may only be made after curetting and examining the fragments with the microscope.

Caneer of the body must be distinguished from :—

Retained bits of placenta or membranes.
Sloughing polypus.
Hæmorrhagic endometritis.
Sarcoma of the body.

Treatment.—Removal of whole uterus if possible ; Otherwise palliative treatment as in cancer of cervix.

SARCOMA UTERI.

I.—OF THE BODY.

Pathology.—There are two forms :—

1. Diffuse sarcoma of the mucosa.
2. Circumscribed fibro-sarcoma of the wall.

The *diffuse* form causes the mucosa to be swollen in a mass or irregularly; it may form polypi, which may grow into the vagina. The newly formed tissue

is brain-like in colour and consistence. When removed it reforms very rapidly. On microscopic examination, this form is found to be the round-cell sarcoma ; there may be in a few places spindle-cells.

The *circumscribed* form arises in the muscular wall, and may extend outwards or inwards. They are firm like fibroids, but have no capsule. They are composed of spindle and round-cells, and fibrous tissue.

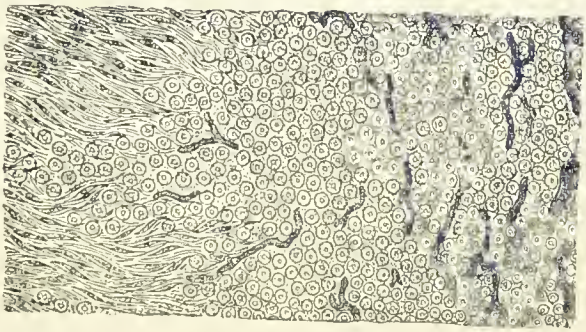


Fig. 44.—*(Pozzi.)*

Diffuse Sarcoma of the Uterus.

Sarcoma sometimes arises in a fibroid, or in an adenoma of the mucosa.

The disease may extend through to the peritoneum, and may affect other parts. It may extend along the Fallopian tubes. Secondary nodules may also grow in the vagina.

Sarcoma uteri may lead to inversion of the uterus. It is most frequent between the ages of 40 and 50.

Symptoms.—Menorrhagia, metrorrhagia. Pain is very often absent, though it may be present and very

severe. Watery discharge, blood-tinged, and containing shreds of brain-like matter, is found in the early stages; later, the discharge becomes very offensive. The patient loses flesh and strength, and develops the malignant cachexia.

Diagnosis.—The uterus is usually enlarged; early it is moveable, but tends to become fixed. It is important to pass the finger through the cervix, in order to feel the condition, and also to remove scrapings for microscopic examination.

In the early stages especially, it is often difficult to make a certain diagnosis. The condition may be mistaken for:—

Hæmorrhagic Endometritis.
Fibroids.
Carcinoma.

Treatment.—Total extirpation of the uterus is the only means of radical cure. If this be not advisable, as much of the disease as possible may be removed by the curette, and iodised phenol applied to the raw surface.

II.—OF THE CERVIX.

Sarcoma is very rare here. It may grow in the substance of the cervix, or as a polypus projecting into the vagina.

AFFECTIONS OF THE VULVA.

MALFORMATIONS.

Atresia of the Vulva.—Only found in monstrosities.

Persistence of a Cloaca.—Here the rectum, vagina, and urethra have a common external opening. It is due to the non-formation of the recto-vaginal septum.

Persistence of the Uro-genital Sinus.—Here there is no urethra, the bladder opening directly into the sinus; this condition is known also as hypospadias.

True Hermaphroditism.—Here both ovaries and testicles are formed, on both sides or only on one side: it is rare; usually the external organs of one sex predominate, thus characterising the sex.

False or Pseudo-Hermaphroditism.—Here the external organs are malformed, so that they may resemble those of the opposite sex.

(*a*) In the female, the clitoris with its prepuce may be hypertrophied, resembling a penis, and the

labia majora may be approximated resembling a scrotum; sometimes the clitoris may be pierced by the urethra.

(*b*) In a male the persistence of a uro-genital sinus or hypospadias may give rise to an appearance like the female external genitals. The penis may be small, the urethra opening at its base. The halves of the scrotum may resemble labia majora. Epispadias in the male, the condition in which the urethra and bladder cavity is exposed, might be mistaken for hermaphroditism, but the presence of scrotum, testicles, and normal perineum show its real nature.

VULVITIS.

Pathology.—It is acute or chronic. It may affect the outer surface of the vulva, or those parts which are in approximation. In the former, the inflammation is of the follicular form, affecting chiefly the roots of the hair; in the latter the surfaces may be reddened, swollen, and tender. The Bartholinian glands may become affected, and may form abscess cavities. Gangrene sometimes occur after labour.

Causes.—Secondary to vaginitis and irritating discharges from cancer, vesico-vaginal fistula, etc.; dirty habits, and much walking in summer, in fat women especially; attempts at coitus, masturbation, ill-fitting pessaries; in dirty children urine dribbling may cause it, especially if they are strumous or weakly.

Treatment. — Douch the parts with warm water, using a lead and opium lotion if there be much pain. Powder the affected parts twice daily with calamine and iodoform powder. In chronic cases use a lotion of weak corrosive sublimate (1 in 6000), or of sulphate of copper.

A Bartholinian abscess requires to be opened, and its lining membrane destroyed with the cautery.

PRURITUS VULVÆ.

Itchiness of the external genitals. It is in most cases most marked about the clitoris and labia minora; it may affect one, both, or parts of the labia majora.

Etiology.—The drying of diabetic urine on the vulva; eruptions and inflammation; irritating discharges from uterus, vagina, or bladder; worms in the vagina; congestion of the parts in pregnancy; reflex irritation from worms in the rectum, or from various diseases of the uterus and vagina; local changes of the nature of fibrosis in the terminal nerves and nerve-endings, especially in the clitoris and labia minora.

Treatment.—Remove the cause if possible, whether local or distant. Keep the parts clean. Where the cause is not clinically recognisable, apply soothing ointments — *e.g.*, menthol, boracic, etc. If no relief be obtained the only means of obtaining a cure is to remove the parts which itch, as the disease is in all probability in the nerves and nerve-endings.

TUMOURS OF THE VULVA.

Bartholinian Cysts.—In most cases on the left side. They are single or multiple; single ones may be lobulated. They may reach the size of an egg. They contain mucus, clear or dark coloured. They only cause symptoms when large, due to the discomfort of their presence. They should be opened and their lining-membrane thoroughly removed.

Cysts of the labia minora are very rare.

Elephantiasis is rare in Europe, though common in the tropics.

Neuroma, Fibroma, and **Lipoma** occur.

Carcinoma is rare. It usually begins on the inner surface of the labia majora as small hard nodules; afterwards, ulceration may occur. The inguinal glands may become affected. The disease spreads about the outer genitals, and does not tend to extend up the vagina.

Sarcoma is rare.

Lupus of the Vulva sometimes occur. It consists in a thickening with ulceration about the outer genitals, remaining a long time, causing little pain, and not causing enlargement of glands.

Kraurosis Vulvæ.—This is the normal shrinking in the external genitals which occurs in old women.

The sebaceous and sweat glands become fewer, the hair gets less, and the tissues lose their fat and become more fibrous.

Hernia into the Pudenda.—This is an inguinal hernia which has descended into a labium majus. It may be mistaken for a cyst or abscess.

Varix.—This may be found in pregnancy and with large pelvic tumours. It may reach a large size.

Hæmatoma.—It usually results from injury in labour; it may be caused by a fall or a blow, or even by a severe muscular effort. The treatment is rest, and the local application of ice. If suppuration occur the abscess must be opened.

RUPTURE OF THE PERINEUM.

This occurs in connection with labour.

Varieties. — In all labours the hymen is torn, usually in the middle line, behind; in most cases, however, the fourchette and the perineal body are torn to a greater or less extent. Rarely, central rupture of the perineum occurs.

Etiology. — The following conditions in labour may lead to rupture:—Large head or body of child; an occipto-posterior case with the occiput rotated to the back; face cases with the chin rotated to the back; precipitate labour; narrow sub-pubic angle;

straight sacrum; rigidity of parts in an elderly primipara, or due to disease; bad use of forceps; forcing hand into vagina without sufficient dilatation.

Symptoms.—If the sphincter ani be not torn there may be no symptoms, unless there is some degree of prolapsus uteri as well. When the sphincter ani is torn, there is partial or total incontinence of fæces.

Treatment.—The tear should be closed—

I.—IMMEDIATELY AFTER ITS OCCURRENCE.

Here the raw surface is closed by means of continuous or interrupted sutures, care being taken not to bring the sutures, through the skin surface, but just inside, in order that there may be no reflex retention of urine. If the anus has been torn into, its torn edges must first be approximated by three or four separate catgut sutures tied in the anus.

II.—AFTER IT HAS LASTED FOR MONTHS OR YEARS.

(*a*) *When the sphincter ani is not torn through.*—Various forms of operations are performed.

1. The usual one is as follows:—Patient is placed in the lithotomy position, and the usual antiseptic precautions observed. With angled scissors make a horse-shoe incision in front of anus, the concavity looking forwards, and the sides of the cut running on to the inner surfaces of the labia majora. Cut into the recto-vaginal septum for about an inch, and then draw forwards the anterior flap in the middle

line, thus leaving a lozenge-shaped raw surface. This is closed from side to side by the continuous catgut suture which is brought out finally through the skin, in order to bring the skin-edges together. The patient is then kept in bed with the knees tied together, the urine being drawn off for some days.

2. Much less often is a raw surface made on the cicatrised anterior surface of the perineum, and then closed from side to side with sutures.

(*b*) *When the sphincter ani is torn through.*—Here an incision is made on each side from the torn end of the sphincter ani forwards on the inner margins of the labia majora; a transverse incision joining these is made into the free edge of the recto-vaginal septum. In this way two anterior and two posterior flaps are marked out; they are then raised by means of scissors, except at their attached margins. The two posterior are anal flaps, and the two anterior vaginal; they are turned backwards and forwards respectively, and thus a quadrilateral space is bared, in which appear the torn ends of the sphincter ani. The anterior flaps are then stitched together in the middle line by several catgut sutures. The anal flaps are turned down and brought together by several sutures tied in the anus. The quadrilateral space is next closed from side to side by continuous catgut suture, care being taken to approximate the torn ends of the sphincter ani.

AFFECTIONS OF THE PELVIC FLOOR.

DOWNWARD DISPLACEMENTS.

PROLAPSUS UTERI.

The most common displacement is a hernial condition of one part of the floor through another, usually known as "prolapsus uteri."



Fig. 45.—*(Pozzi.)*

Prolapsus Uteri—complete.

Pathology.—The factors concerned in the production of this condition are, as Hart has shown, solution of continuity of the floor—*i.e.*, rupture of the perineum, weakening of the parts of the floor, and intra-abdominal pressure. The first two of these usually result from labour. An increase in the third factor, as in chronic bronchitis, is very important in relation to the formation of the prolapsus.

The sac of the hernia is, of course, the peritoneum; its boundaries are symphysis pubis, anterior rectal wall, obturator internus, and levator ani muscles; its coverings are bladder, anterior and posterior vaginal walls, and uterus.

In the hernial sac are intestines.

In most cases the following stages are passed through in the formation of this condition:—the anterior vaginal is forced gradually down from below upwards; the uterus becomes more and more retroverted, and is forced gradually down; the posterior vaginal wall is forced down from above downwards—*i.e.*, its lower end is last to appear. In the most advanced prolapsus the greater portion of the bladder is below the symphysis, the vaginal walls are entirely unrolled, and the uterus lies outside the pelvic outlet.

The uterus is usually enlarged; the vaginal walls are thickened, and may be ulcerated or excoriated.

Symptoms.—Bearing-down in the pelvis; pain, difficulty in micturition. There may be much sensitiveness and leucorrhœa if the protruded parts are excoriated.

The condition must be diagnosed from hypertrophy of the vaginal and of the supra-vaginal portions of the cervix, cystocele, rectocele, inversion of the uterus, inversion with polypus.



Fig. 46.—*(Pozzi.)*

Prolapsus Uteri, seen in Vertical Mesial Section.
There is some Supra-Vaginal Hypertrophy.

Treatment.—

I. BY PESSARIES.

Replace the uterus, and in slight cases use a Hodge pessary; in advanced cases a ring, or diaphragm ring pessary; a Zwanck pessary is used by some. Use astringent douches.

In some cases these pessaries will not remain in, and, where an operation will not be agreed to by the patient a ball plug may be used, or a cup and stem pessary attached to an abdominal belt.

II. BY OPERATION.

The usual method of procedure in a well marked case is as follows:—

(*a*) Amputate the cervix if there be much uterine hypertrophy. Usually a previous curretting is done.

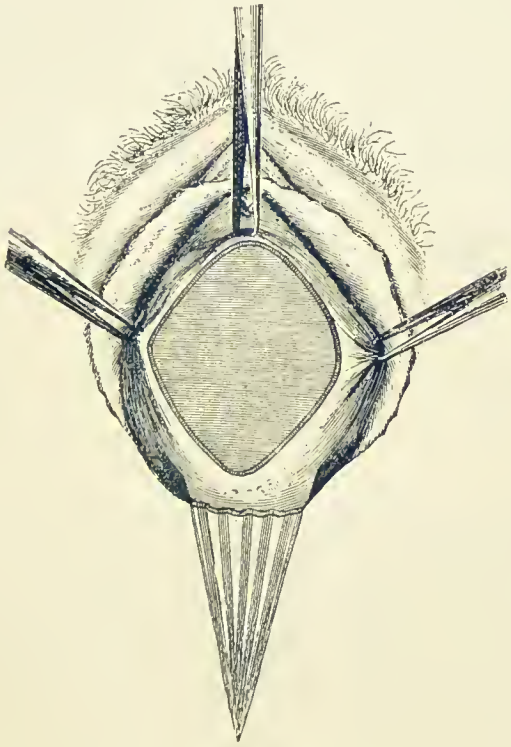


Fig. 47.—*(Pozzi.)* ANTERIOR COLPORRHAPHY. Anterior Vaginal Wall, with raw surface, is seen.

(*b*) Perform *anterior colporrhaphy.* This consists in the removal of an oval flap from

the anterior vaginal wall and closing it from side to side by means of a continuous catgut suture.

(*c*) Repairing of the perineum exactly as described on page 154.

Instead of (*c*) a posterior colporrhaphy, or posterior colpo-perinæorrhaphy is done by some. The latter consists in the removal of a flap from the posterior vaginal wall and perineum, and closing it from side to side with sutures.

Other operations for prolapsus uteri—*e.g.*, shortening of the round ligaments, and excision of the uterus are not recommended.

PROLAPSE OF THE WHOLE PELVIC FLOOR.

This may sometimes follow labour, or may result from such an injury as will apply great and sudden pressure to the abdomen. It causes a great feeling of weight and dragging-down in the pelvis. The treatment is to wear a perineal band attached to an abdominal band.

Prolapse of the anterior Vaginal wall may occur. *Vide* "Cystocele."

Prolapse of the posterior Vaginal wall may occur. *Vide* "Rectocele."

VAGINAL ENTEROCELE.

Anterior or posterior may occur. In the former, intestines are driven down between the bladder and the upper part of the anterior vaginal wall, and in the latter, between the anterior rectal and posterior vaginal walls. A mass is thus made to bulge into the vagina.

Treatment.—A pessary may be tried; but if not successful, a raw surface may be made on the bulging wall and closed from side to side with sutures.

AFFECTIONS OF THE VAGINA.

VAGINITIS.

Pathology.—In most cases a granular condition is produced by inflammation of the vagina, due to the elevations of the surface resulting from small-celled infiltration under the epithelium. As the inflammation progresses the superficial epithelium is shed, and the granular condition becomes less marked. In vaginitis with pregnancy the wall may develop cysts containing air or fluid.

In senile cases the epithelium is shed in many places, and thus raw-looking areas are produced. These often adhere, and cause great shrinking of the vagina.

In cases of diphtheritic vaginitis the characteristic membrane covers parts or the whole of the wall which becomes greatly thickened.

In gonorrhœal vaginitis the gonococcus is found in the discharge.

Causes. — Gonorrhœa; irritating discharges from the uterus or bladder; irritants—*e.g.*, ill-fitting pessaries, too hot douches, etc; exanthemata.

Symptoms.—A burning feeling with pain in and near the vagina; frequency of micturition; scalding pain in the urethra while urine is passing; abundant white discharge.

These symptoms are most pronounced in acute cases, and especially when due to gonorrhœa.

Diagnosis.—The granular condition of the walls can be felt, and inflamed areas may be seen. The condition is usually easily recognised. A pelvic abscess discharging into the vagina has been mistaken for it.

Treatment.—

In the acute stage.—Rest in bed; free movement of the bowels; hot boracic douche; morphina suppositories if the pain is great.

In the chronic stage.—Astringent douches—*e.g.*, alum, copper, sulphate, etc.

In old-standing cases it is good to apply a solution of nitrate of silver (ʒi to ℥i of water), or one of chloride of zinc (2 grs. to ℥i) to the affected parts.

VAGINISMUS.

A reflex contraction of the vaginal orifice associated with pain. It occurs when attempts at coitus are made.

Causes.—It may occur in neurotic women without any local lesion. In most cases one or other of the following conditions exist:—

An unruptured tender hymen.
Tender carunculæ myrtiformes.
Fissures or sores about the vulva.
Urethral caruncle.
Fissure of the anus.

Symptoms.—Pain and difficulty in performing or attempting coitus. On examination we find that there is contraction of the vaginal orifice when the finger is passed; in some cases it is impossible to examine the patient without an anæsthetic.

Treatment.—Remove the local cause—*e.g.*, hymen, carunculæ myrtiformes, caruncle. Then dilate the vaginal orifice. This is best done with the fingers, the patient being anæsthetised. The patient should sleep away from her husband for some time, and should go away for a change of air, if possible. If the patient be run down, tonics may be given.

TUMOURS OF THE VAGINA.

These are cysts, fibroma, fibro-myoma, lipoma, carcinoma, sarcoma.

Cysts.—These are mostly in the anterior wall low down, and are usually single. They may vary from the size of a pea, to that of a hen's egg; their contents may be clear and thin, thick, gelatinous, grey or dark-coloured.

They are caused in various ways: they may arise from the closure of depressions in the vaginal mucous membrane; they may be developed from the remains of Gärtner's canals; from one Müllerian duct; from blood or lymph exudations into the vesico-vaginal septum.

There may be no symptoms where the cysts are small. If they open into the urethra the urine may collect, inflammation occur, and calculus form. When large there may be a bearing-down feeling complained of, and dyspareunia.

Treatment.—Open into the cyst, remove or destroy the lining membrane thoroughly, and close the wound.

Fibroids and Fibromata are rare. They occur mostly in the anterior wall. They are sessile or polypoidal. They only cause trouble when of large size. They should be removed.

Carcinoma is rarely primary in the vagina. It may be papillary, or may infiltrate the tissues, often completely encircling the canal. When the lower part of the vagina is affected the inguinal glands get enlarged.

The symptoms are the same as in the case of cancer of the cervix; the treatment is also the same.

Sarcoma is very rare, and may occur very early in life. It tends to occur after removal.

Tuberculosis is very rare. It may be primary or secondary.

ATRESIA OF THE VAGINA.

Complete occlusion of the vagina.

It may occur at the hymen or in any part of its length.

Etiology.—Atresia may be congenital or acquired. The congenital cases may be due to the non-development of some part of the vagina, or to its closure by

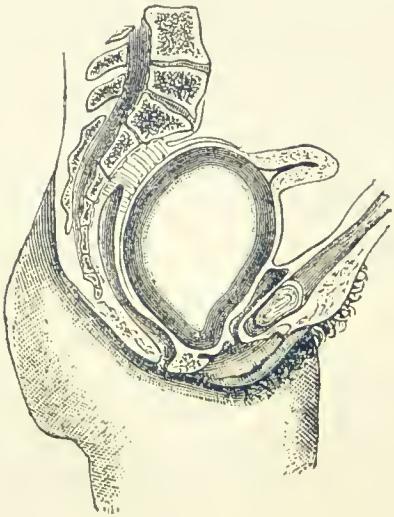


Fig. 48.—*(Schroeder.)*

Atresia of Hymen, Vagina distended.

inflammation when once formed. Such are hymeneal atresia, atresia of the lower, middle, or upper third of the vagina, absence of part or whole from non-development. The acquired cases are caused by

inflammations and injuries. Inflammation may occur in the exanthemata, after labour, etc.

Of congenital cases, hymeneal atresia is the most common, and next, closure of the lower third of the vagina; of acquired cases, the commonest form is that in which the upper part of the vagina and cervix are affected, as a result of sloughing after labour.

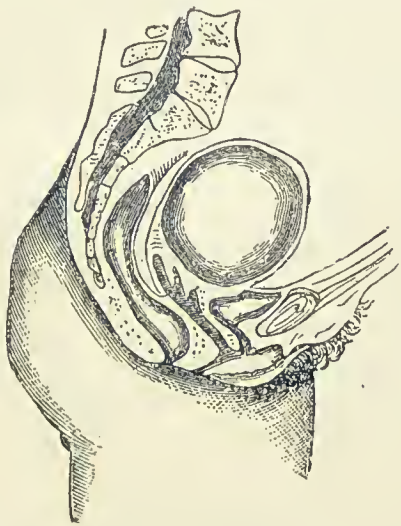


Fig. 49.—*(Schroeder.)*

Atresia of Cervix at Os Internum, Uterus distended.

Pathology.—When the girl begins to menstruate the blood collects above the obstruction. This goes on until the vagina dilates considerably; the uterus may also become gradually dilated, and the Fallopian tubes as well.

The dilatation of the vagina may be so great as to fill the pelvis. The blood in the tubes is said not to be a reflux from the uterus, but due to

hæmorrhage from their walls. Sometimes blood escapes suddenly through their fimbriated ends, giving rise to a hæmatocele, or slowly causing peritonitis.

The thickness of the atresic portion usually becomes lessened as dilatation goes on above it.

The retained blood is at first thick and brownish; later, it becomes paler. The wall of the sac is often lined with fibrin in thick masses. It may become purulent.

The obstruction may sometimes rupture or slough through.

Symptoms.—These are not noticed until puberty occurs. The menstrual periods recur, but there is no discharge of blood. Pelvic pain is felt at these times; it increases in its duration until it may become continuous between the periods. The swelling may be noticed at the vulva, or above the pubes. It may cause trouble with micturition or defæcation.

Diagnosis.—The recto-abdominal bi-manual should be performed under an anæsthetic. Through the rectum the distended vagina is felt as a firm mass, or as an elastic sac. Above the vagina a swelling, the hypertrophied uterus, may be felt in the early stages; or, later, only the fundus may be recognised, the rest of the uterus having become so dilated as to form part of the general sac. The Fallopian tubes may also in some cases be distended. In atresia of the hymen the urethral orifice is dilated and the hymen is bulged outwards somewhat; in atresia of the lower part of the vagina, the same appearance may be produced;

in atresia higher up, nothing abnormal is seen at the vulva.

When the whole vagina is congenitally closed, malformation in the uterus is usually present.

Treatment. — In the case of hymeneal atresia, puncture the obstruction with a troear and allow the fluid to escape very slowly. When it is all away, enlarge the incision by cutting out a bit of the hymen and wash out the vagina with an antiseptic lotion. The patient should remain in bed for some days, being douched daily.

In atresia of the vagina, dissect up through the obstruction by a transverse incision, puncture the sac and empty it slowly. Then enlarge the opening, wash out with antiseptic lotion, and put in a glass plug large enough to keep the opening well dilated. The eavity should be washed out frequently afterwards, and the tube changed, so that it ean be kept clean. After a time the raw canal gets eovered with epithelium, and a new vagina is thus formed. A plug should be worn for some time afterwards, between the menstrual periods, in order to prevent much contraetion.

Atresia of the Cervix is best considered here.

The changes met with occur after puberty. The uterus dilates to a eonsiderable size, and may be mistaken for a pregnant uterus. The symptoms are the same as in atresia vaginæ. The treatment is also the same.

Atresia of one half of a Septate Uterus, and Vagina.—Here there is on one side free menstrual flow, and on the other an obstruction to the flow. Dilatation of the affected side occurs. Rupture may occur into the other side. The symptoms are the same as in ordinary atresia, with the addition of menstruation; the latter is often irregular, however. The diagnosis is easy after physical examination, if the tumour extends well down the vagina, but if it be limited to the uterus or to the uterus and upper part of the vagina only, it may be mistaken for a broad ligament or intra-peritoneal swelling close to the uterus.

The treatment is the same as in ordinary atresia; in addition, the septum may be removed.

When there is no atresia, a septate vagina causes no symptoms, and may never be recognised until the time of labour. The septum may be partial or complete.

AFFECTIONS OF THE URETHRA AND BLADDER.

MALFORMATIONS.

Absence of urethra; defect of outer or inner end of urethra; atresia of urethra; extroversion of bladder.

I.—AFFECTIONS OF THE URETHRA.

DISPLACEMENTS.

Urethrocele.—This is a pouching of the lower urethral wall together with the anterior vaginal wall. Urine may lodge in it, and a calculus may form.

The treatment is to cut away the prolapsed part and to close the edges with sutures.

Prolapse of Mucous Membrane.—The mucous membrane may project outside the urethral orifice. The treatment is to remove the excess.

NEW GROWTHS.

Caruncle.—This is an angiomatous tumour rich in nerves, and is usually situated at the external urethral orifice. It may vary in size from a pin head to a marble. It is bright red in colour.

Its presence causes pain on making water; in some cases, retention; sometimes there is pain on coitus.

The treatment is to remove it thoroughly with a cautery.

Papillomata, Polypi, Sarcomata, Carcinomata are rarely found.

Urethritis.—This is in the majority of cases associated with acute gonorrhœa. The urethral mucosa is swollen and tender, and secretes pus. A burning pain is felt when the patient passes water.

Dilatation of the Urethra is sometimes found as a result of coitus in malformations of the vagina.

Stricture of the urethra is very rare.

II.—AFFECTIONS OF THE BLADDER.

DISPLACEMENTS.

Cystocele.—This is a pouching downwards of the posterior wall of the bladder, along with the anterior vaginal wall. It is a common condition after the menopause. The treatment is to place a diaphragm-ring pessary in the vagina, or to do a large anterior colporrhaphy.

NEW GROWTHS.

Mucous Polypi, Fibroma, Fibro-myoma, Papilloma, Sarcoma, Carcinoma.

Symptoms.—Bladder irritation; frequency or difficulty in micturition, and often pain; hæmaturia.

TREATMENT.—The tumour should be removed, if suitable, either through the dilated urethra, or through an opening into the bladder made through the anterior vaginal wall.

CYSTITIS.

Pathology.—In acute cases there is congestion of the bladder mucosa, cloudy swelling and shedding of the epithelium; in chronic cases the mucosa is infiltrated, thickened and rugose.

The other tissues of the wall may be affected in some cases, or the inflammation may spread to the para-vesical tissue. The mucous membrane may slough away in rare cases. It may become ulcerated in places. Hydronephrosis may follow upon old standing cases; also septicæmia.

Causes. — Gonorrhœa; latent gonorrhœa; cold; injury; compression of the bladder by the head in a delayed labour; septic matter introduced by dirty instruments; calculus; excessive retention of urine.

Symptoms.—In acute cystitis there is frequency of micturition with pain. In chronic cystitis the same symptoms are found, but the pain is not so marked; the patient is usually run down, with an anxious look, and exhibiting reflex nervous disturbances.

Physical Signs.—In *acute* cases the specific gravity is lessened, the reaction is acid; there is excessive

mueus, and bladder epithelium is found. In *chronic* eases the sp. gr. is low, the reaction usually alkaline, and the smell disagreeable; pus, baeteria, epithelium, and phosphates are found in the urine.

On *vaginal* examination in acute eases, there is great pain when the anterior wall is pressed forwards; this is less marked in chronic eases. In the latter, if the interior of the bladder be examined, the mucosa is felt roughened; phosphatie deposits may also be felt.

Chronic eystitis must be diagnosed from tubereular disease of the kidney. The symptoms are often mueh the same, only the bladder is found to be unaltered on physieal examination, while the kidney may be found to be enlarged.

Treatment. — In *acute* cases, rest in bed, milk, and diluent drinks. Give a mixture of liquor potassæ, hyoscyamus, and buehu internally; it may be neeessary to use morphia suppositories; the bowels must be kept open. In *chronic* cases, milk diet, diluent drinks, attention to the bowels. Give inwardly boraeic acid, salol, ammonium benzoate, or a mixture of nitrie aeid, hyoseyamus and buehu. If these means fail, wash out the bladder daily with a weak antiseptie lotion—*e.g.*, eorrosive sublimate (1 in 6000), and drain the bladder by means of a flexible metal eatheter. In obstinate cases the urethra may be thoroughly dilated to the size of a medium-sized forefinger, and the bladder allowed to drain freely and to get rest, or an artificial vesieo-vaginal fistula may be made, whieh ean be closed after the bladder is healed.

FOREIGN BODIES IN THE BLADDER.

Calculi — uric acid, oxalates, phosphates, etc.; bodies passed up the urethra by the women themselves—*e.g.*, pencils, hair-pins, etc.; pus from neighbouring abscesses, bones from extra-uterine pregnancy, echinococci, and other parasites. Foreign bodies may be nuclei for calculi.

Calculi.—These vary in size. Small ones may be passed by the urethra, or may become impacted at the meatus.

Symptoms.—Pain on making water, especially at the close; bloody urine. Some cystitis is usually present.

Treatment.—Stones not larger in diameter than the index finger may be removed by the urethra; if larger in size they may be crushed and removed; if of very large size they can be removed through an opening into the base of the bladder.

FUNCTIONAL DISEASES.

These are Irritability, Incontinence, Retention.

These conditions are of course also found with distinct organic lesions. In the present connection they are considered in relation to the absence of any discoverable lesion.

Irritability.—This causes frequency of micturition. It may be due to very acid urine, or to some nervous derangement. It must be remembered that constant dribbling may take place from an over-distended bladder.

Incontinence.—Common in children from irritable condition about the genitals, worms in the rectum, or nervous derangement.

Retention. — It is sometimes due to hysteria. Often it is due to local mechanical causes—*e.g.*, ovarian or uterine tumours, retroflexion of the gravid uterus, etc. It may occur reflexly in irritating urethral, vaginal, perineal, or anal conditions.

FISTULA.

The following are the forms of fistula between the urinary and genital tracts : — Urethro - vaginal, vesico - vaginal, vesico - uterine, uretero - vaginal, and uretero-uterine.

The urinary, genital, and rectal tracts may be connected by a fistula as the result of cervical carcinoma.

VESICO-VAGINAL FISTULA.

Pathology.—This is the most common form. They vary in diameter from the size of a pin's head to a sixpence, and larger. Freshly formed ones shrink somewhat in course of time from cicatrisation ; the edges, at

first raw and swollen, become thin and hard. When the fistula is large, the bladder mucosa may protrude through. After a time the wall becomes contracted and thickened. The urethra, when not in use, also contracts, and may even become closed. The vagina may also contract considerably as a result of the injury which caused the fistula.

The ureters may be implicated in the tear.

Causes. — Malignant disease. Injury in labour; either a tear, or pressure followed by necrosis. Inflammation and ulceration as a result of ill-fitting pessaries. Diphtheritic inflammation.

Symptoms.—Involuntary flow of urine through the fistula into the vagina. This takes place immediately after the labour where a tear has been the cause of the trouble, though it may escape observation by being mixed with the uterine discharge.

In cases where necrosis is the cause, the flow of urine *per vaginam* does not occur for three or four days, or even longer in some cases.

When the fistula is high up, the flow is continuous when the patient is lying down, but when the body is erect, the part of the bladder below the level of the fistula will collect some urine.

Secondary symptoms are the urinous odour, the redness and excoriation about the external genitals, amenorrhœa, and generally sterility. The general health is below par, stomach and bowels get out of order.

Diagnosis.—If the fistula be large, it may be felt on vaginal examination. A sound passed into the bladder easily enters the vagina. Smaller ones may be recognised on examination of the vagina with a spatular speculum, especially after having filled the bladder with coloured fluid, which escapes through the fistula.

Treatment.—In a few cases small fistulæ heal in the puerperium if the vagina be regularly douched.

In the majority of cases the fistula must be closed by operation.

The operation consists in paring the edges of the fistula, and then in approximating the raw surfaces by several sutures. The patient is kept in bed, and the bladder drained by flexible metal catheters. For a couple of days ergot may be given, in order to prevent any oozing of blood into the bladder, and boracic acid or salol should be given for some days in order to keep an antiseptic urine constantly passing through the bladder.

In cases of very large fistulæ which cannot be closed, the best thing to do is to close the lower end of the vagina, in order to allow the upper part to form part of the bladder. The menstrual blood is of course then discharged by the urethra.

The other forms of fistula are very rare.



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